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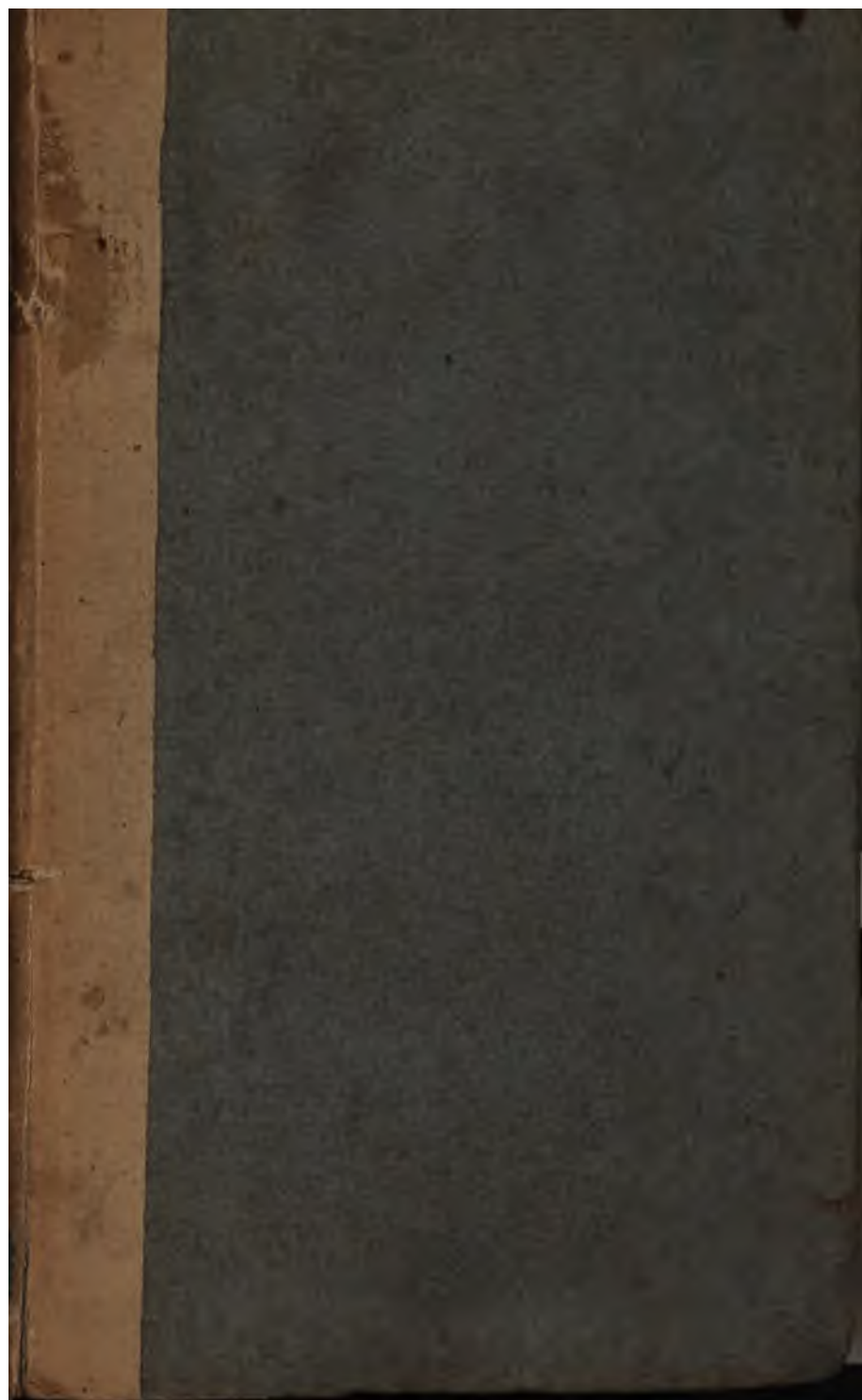
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& Mary J. 10712

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To the Bodleian Library
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3 February 1908.

1. The first part of the paper is devoted to a discussion of the various methods of determining the rate of growth of a population. The methods are classified into two main groups: (a) direct methods, and (b) indirect methods. The direct methods are those in which the rate of growth is determined by direct observation of the population. The indirect methods are those in which the rate of growth is determined by indirect observation of the population.

AN
INTRODUCTION
TO
BOTANY,
IN A SERIES OF

FAMILIAR LETTERS,

WITH
ILLUSTRATIVE ENGRAVINGS.

By PRISCILLA WAKEFIELD,
Author of Mental Improvement, Leisure Hours, &c.

The Fifth Edition.

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PREFACE.

THE design of the following Introduction to Botany, is to cultivate a taste in young persons for the study of nature, which is the most familiar means of introducing suitable ideas of the attributes of the Divine Being, by exemplifying them in the order and harmony of the visible creation. Children are endowed with curiosity and activity, for the purpose of acquiring knowledge. Let us avail ourselves of these natural propensities, and direct them to the pursuit of the most judicious objects: none can be better adapted to instruct, and at the same time amuse, than the beauties of nature, by which they are continually surrounded. The structure of a feather or a flower is more likely to impress their minds with a just notion of Infinite Power and Wisdom, than the most profound discourses on such abstract subjects as are beyond the

the limits of their capacity to comprehend. In the important business of forming the human mind; the inclination and pleasure of the pupil should be consulted: in order to render lessons effectual, they should please, and be sought rather as indulgencies, than avoided as laborious toils. Botany is a branch of Natural History that possesses many advantages; it contributes to health of body and cheerfulness of disposition, by presenting an inducement to take air and exercise; it is adapted to the simplest capacity, and the objects of its investigation offer themselves without expence or difficulty, which renders them attainable to every rank in life; but with all these allurements, till of late years, it has been confined to the circle of the learned, which may be attributed to those books that treated of it, being principally written in Latin: a difficulty that deterred many, particularly the female sex, from attempting to obtain the knowledge of a science, thus defended, as it were, from their approach. Much is due to those of our own countrymen, who first introduced this.

this delightful volume of nature to popular notice, by presenting it in our native language; their labours have been a means of rendering it very generally studied, and it is now considered as a necessary addition to an accomplished education. May it become a substitute for some of the trifling, not to say pernicious, objects that too frequently occupy the leisure of young ladies of fashionable manners, and by employing their faculties rationally, act as an antidote to levity and idleness. As there are many admirable English books now extant upon the subject, it may require some apology for obtruding the present work upon the public. It appeared that every thing hitherto published was too expensive, as well as too diffuse and scientific, for the purpose of teaching the elementary parts to children or young persons; it was therefore thought that a book of a moderate price, and divested as much as possible of technical terms, introduced in an easy, familiar form, might be acceptable.

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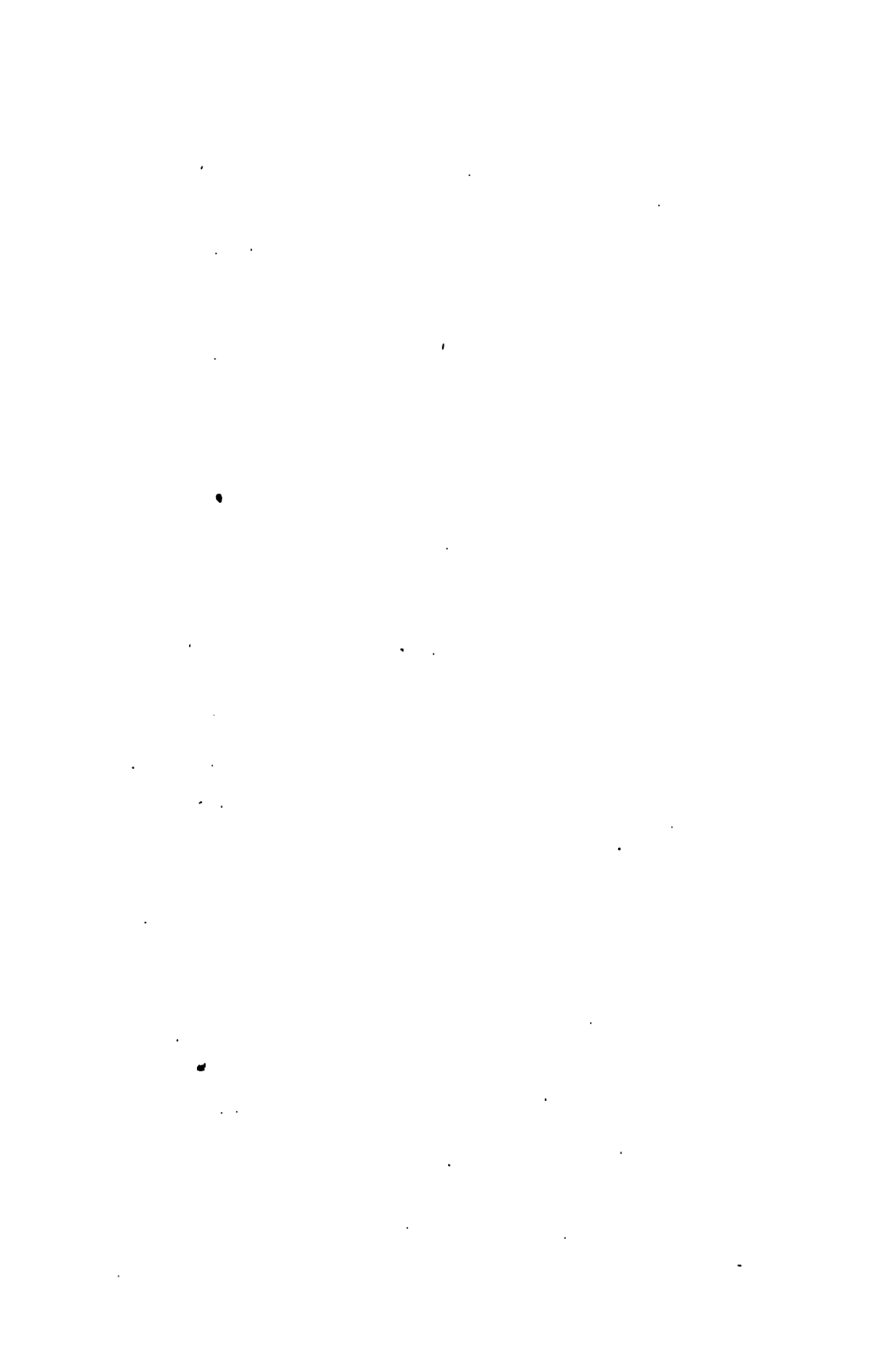


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AN
INTRODUCTION
TO
B O T A N Y.

LETTER I.

FELICIA TO CONSTANCE.

DEAR SISTER,

Shrubbery, February 1.

AS it is an unusual thing for us to be separated, I do not doubt but we equally feel the pain of being at a distance from each other. When I consider, that you are really gone to pass the whole summer with my aunt, and that I have parted with the beloved companion of my walks and amusements, I think I shall but half enjoy either, during the fine season that is approaching. With you, indeed, the case will be rather different; new scenes will present themselves, which will entertain by their novelty and variety, and the kind attentions of my aunt and cousins will compensate, in degree, for the ab-

B sence

sence of those friends you have left at home. Every place here looks solitary, especially our own apartment, and our favourite haunts in the garden. Even the approach of spring, which is marked by the appearance of snowdrops and crocusses, affords me but little pleasure. My kind mother, ever attentive to my happiness, concurs with my governess in checking this depression of spirits, and insists upon my having recourse to some interesting employment, that shall amuse me, and pass away the time while you are absent. My fondness for flowers has induced my mother to propose Botany, as she thinks it will be beneficial to my health, as well as agreeable, by exciting me to use more air and exercise than I should do, without such a motive; because books should not be depended upon alone, recourse must be had to the natural specimens growing in fields and gardens. How should I enjoy this pursuit in your company, my dear sister! but as that is impossible at present, I will adopt the nearest substitute I can obtain, by communicating to you the result of every lesson. You may compare my descriptions with the flowers themselves, and, by thus mutually pursuing the same object, we may reciprocally improve each other. I am impatient to make a beginning, but am full of apprehension of the number of hard words at the entrance. However,

ever, I am resolved not to be deterred by this difficulty; perseverance and patience will overcome it; and, as I know the easy method of instruction adopted by my dear governess in other sciences, I confide in her skill to render this easy and pleasant. Farewel.

FELICIA.

LETTER II.

Shrubbery, February 10.

THE morning being fine tempted us abroad: Botany supplied us with subjects for conversation. Mrs. Snelgrove took the opportunity of remarking, that a perfect plant consists of the root, the trunk or stem, the leaves, the supports, flower, and fruit; for, (botanically speaking,) by fruit in herbs, as well as in trees, is understood the whole formation of the seed: and as each part needs a particular explanation to a novice, she began her lecture by pointing out the uses of the root. The first, and most obvious, is that of enabling the plant to stand firmly in the

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ground,

ground, by serving as a balance to the head. By what means could the enormous oaks in the park be kept upright and fixed, but by their extensive turgid roots: they serve as a counterpoise against the weight of the trunk and branches. The chief nourishment of the plant is received by the radical, or fibrous part of the roots, that, like so many mouths, absorb the nutritious juices from the earth. The root also performs the part of a parent, by preserving the embryo plants in its bosom, during the severity of winter, in form of bulbs or buds: bulbs are properly but large buds, eyes, or gems, including the future plants. Nature is an economist, and is sparing of this curious provision against the cold, where it is unnecessary. In warm countries, few plants are furnished with winter buds. Roots are distinguished by different names, according to their forms; as fibrous, bulbous, and tuberous; with many other lesser distinctions, expressive of their manner of growth.

The next part of a plant that claims our notice, is the trunk or stem, which rises out of the root, and supports the flower, leaves, &c. The trunk of trees and shrubs (and it is supposed that the stem of the more diminutive kinds of plants, in the same manner) consists of several distinct parts: as the bark; the wood; the sap-vessels, corresponding to the blood-vessels in animals;

mals; the pith; the tracheæ, or air-vesicles; and the web or tissue; each of these parts has its peculiar use, and its construction is admirably adapted to its purpose. The bark of plants seems to perform the same offices to them that the skin does to animals; it clothes and defends them from injury, inhales the moisture of the air, and extracts, or conveys from the plant the superfluity of moist particles. The cause of evergreens retaining their foliage during the winter, is supposed to arise from an abundant quantity of oil in their barks, which preserves them from the effects of cold. The bark (as well as the wood) is supplied with innumerable vessels, which convey the fluid to and from every part of the plant; the wood is also furnished with others, which contain air, and is distributed throughout its substance. The stability of trees and shrubs consists in the wood, which corresponds with the bones of animals. The seat of life seems to reside in the pith or medullary substance, which is a fine tissue of vessels, originating in the centre. The fluids of plants are the sap, analogous to the blood of animals; and the proper juice, which is of various colours and consistence in different individuals; as white or milky in the dandelion, resinous in the fir, and producing gutta in cherry or plum trees, &c. Hoping that I have given you such a clear description of the

root and stem, as will enable you to form a general idea of their parts and uses, I shall proceed to leaves, which contribute, at the same time, to the benefit and ornament of the plant. I need not tell you, that the variety of their forms and manner of growth is great; your own observation has long since informed you of this particular, and prepared you to understand the terms by which botanists arrange them, according to their forms and shapes; as simple, compound, rough, smooth, round, oval, heart-shaped, &c. these minutiae must be learned by referring to plates. Leaves are supposed to answer the purpose of lungs, and, by their inclination to be moved by the wind, in some degree, serve also those of muscles and muscular motions. They are very porous on both their surfaces, and inhale and exhale freely. The annual sun-flower is an extraordinary instance of this fact; it is said to perspire nineteen times as much as a man, in twenty-four hours. Fine weather encourages the perspiration of vegetables; but in heavy, moist, and wet weather, the inhalation exceeds. The effluvia of plants is thought unwholesome to persons of delicate constitutions, but particularly so at night and in a dull state of the atmosphere; but it is worth observing, that the air emitted from the leaves is never prejudicial; that which is noxious proceeds from the corollas only.

The

The next parts to be considered, are the supports, or props; by these are meant certain external parts of plants, which are useful to support and defend them from enemies and injuries, or for the secretion of some fluid, that is baneful or disagreeable to those insects that would otherwise hurt them. They are divided into seven kinds; 1st. Tendrils; small spiral strings, by which some plants, that are not strong enough to stand alone, sustain themselves by embracing trees, shrubs, or other supports: the vine, pea, and bindweed afford examples of this. 2dly, Floral leaves; are small leaves placed near the flower, smaller, and mostly of a different form from those of the plant. 3dly, Stipules; small leafy appendages, situated on either side, or a little below the leaf, to protect it, when first emerging from the bud. 4thly, Foot stalks; these support the leaf, and defend and convey nourishment to the infant bud. 5thly, Flower stalks, or foot stalks to the flower and fruit. 6thly, Arms; a general term for the offensive parts of plants, such as thorns, prickles, stings, &c. 7thly, Pubes; a name applied to the defensive parts of plants, such as hairs, wool, a certain hoary whiteness, hooks, bristles, glands, clamminess, and viscosity. In order to enliven a dry detail of names, and a mere description of parts, Mrs. Snelgrove favoured me with an ac-

count of some curious contrivances of nature, observed in some particular plants, for their defence against insects, or larger animals, that would, without this precaution, greatly annoy them; and as I know the pleasure you take in such recitals, I shall repeat them to you before I close this long letter. The viscous matter, which surrounds the stalks, under the flowers of the catchfly, prevents various insects from plundering the honey, or devouring the pollen, which fertilizes the seed. In the *dionæa muscipula*, or Venus's fly-trap, there is a still more wonderful means of preventing the depredations of insects. The leaves are armed with long teeth, like the antenna of insects, and lie spread upon the ground round the stem; they are so irritable, that when an insect creeps upon them, they fold up, and crush or pierce it to death. The sundew, a plant very common in our marshes, is likewise furnished with the same means of defence against its enemies. The flower of the *arum muscivorum* has the smell of carrion, which invites the flies to lay their eggs in the chamber of the flower; but the worms which are hatched from these eggs, are unable to make their escape from their prison, being prevented by the hairs pointing inwards, which has given the name of fly-eater to this flower. The same purpose is effected in the
dypsacus,

dypsacus, vulgarly called teazel, by a bason or receptacle of water, placed round each joint of the stem.

The nauseous and pungent juices of some vegetables, and the fragrance of others, are bestowed upon them, in common with thorns and prickles, for their defence against the depredations of animals. Many trees and shrubs supply grateful food to a variety of creatures, and would be quickly devoured, were they not armed with thorns and stings, which protect them not only against some kinds of insects, but also against the naked mouths of quadrupeds. It is worth remarking, as a farther analogy between plants and animals, that the former frequently lose their thorns, &c. by cultivation, as wild animals are deprived of their ferocity, by living in a domestic state, under the government and protection of man. My letter is already spun out to a tedious length; I must, therefore, reserve the description of the fructification till a future opportunity.—
Adieu: your

FELICIA.

LETTER III.

Shrubbery, February 18.

THE approbation you express, my dear Constance, of my endeavours to amuse you with an account of my botanical lectures encourages me to proceed, though with great diffidence, as I find the subject becomes more intricate as I advance. The fructification includes the flower and fruit, and contains the whole process of perfecting the seeds. It consists of seven parts; and, to illustrate them, I have sketched some particulars from the lily, &c.

1. The (calyx) cup, or empalement, *a*.
2. The (corolla) blossom, petals, or flower-leaves, *b*.
3. The (stamina) stamens or chives, *c*.
4. The (pistillum) pistil or pointal, *d*.
5. The (pericarpium) seed vessel, *e*.
6. The seed or fruit, *f*.
7. The (receptaculum) receptacle, or base, *g*.

Some flowers possess all these parts, others are deficient in some of them; but the chives or the pointals, or both, are essential, and to be found in all, either in flowers on the same plant, or in different

different individual flowers of the same species, on separate plants. I shall give you as clear a description of these several parts as I possibly can, to enable you to distinguish them at first sight. The cup, empalement, or calyx (*a*) is that outer part of the flower, formed of one or more green, or yellowish green leaves, sustaining the corolla at the bottom, and enclosing it entirely, before it expands, as you may remark in the Rose and Geranium, the latter of which I have sketched for an illustration. The empalement is either

- A cup, as in the polyanthus;
- A fence, as in the hemlock or carrot;
- A catkin, as in the willow or hazle;
- A sheath, as in the narcissus;
- A husk, as in oats, wheat, or grasses;
- A veil, as in mosses;
- A cap, as in mushrooms.

The blossoms, petals, or corolla (*b*) is that beautiful-coloured part of a flower, which first draws the attention, and is regarded by common eyes as the flower itself; but botanists, more strict in their definitions, appropriate that term to the composition of the whole of the fructification, of which the corolla is only a part.

The stamens, or chives, are composed of two parts; one long and thin, by which they are

B 6

fastened

fastened to the bottom of the corolla, called the filament; the other thicker, placed at the top of the filament, called anthera, or anther. Each anther is a kind of box, which opens when it is ripe, and throws out a yellow dust, that has a strong smell; this is termed pollen or farina, and is the substance of which bees are supposed to make their wax. The progress of the seed to maturity is deserving the most curious attention. First, the calyx opens, then the corolla expands and discovers the stamens, which generally form a circle within the petals, surrounding the pointal. The pollen or dust, which bursts from the anthers, is absorbed by the pointal, and passing through the style, reaches the germ, and vivifies the seed, which, without this process, would be imperfect and barren. The stamens, pointal, and corolla, having performed their respective offices, decline and wither, making room for the seed-bud, which daily increases, till it attains its perfect state. Many curious experiments have been made by attentive naturalists, that prove the necessity of this communication between the stamens and pointals of the same flower, in order to render its seed productive. The stamens and pointal being sometimes disposed on different plants, the trial may be made by shutting up a pot of those which have pointals only, in some place where they cannot be reached by the pollen

pollen of the stamens of other individual plants; and experiment has constantly shown, that no seed is produced in this situation; but how shall we account for the conveyance of the pollen from one plant to another, growing at a distance from it? They are both fixed, and cannot approach each other; yet nature, ever abounding in resources, has provided sufficient means for the purpose. It is probable that there is an attraction between them, which we may imagine, but cannot perceive; this attractive quality may draw the pollen, floating about in the air, as it is wafted by the winds, to the pointals of its own species; or, in many cases, the numerous tribes of minute winged insects, which we observe so busily employed in a warm day, basking and hovering upon the flowers, may soon convey this fertilizing dust from one to another; and, whilst they are feasting upon the delicious honey afforded by these flowers, return the favour, by rendering them an essential service.

The pointal, or pistil, is composed of three parts. (Plate I.): the germen, the style, and the stigma. The germen varies, as to its form, in different plants, but is always placed below the style; its office is to contain the embryo seeds. The style is placed on the germen, and is of a variety of figures and lengths, and sometimes seems wholly wanting. The stigma also appears of

of different forms, but always retains the same situation, being invariably placed at the top of the style; or, if that be wanting, it is fixed on the germen.

The seed-vessel, or pericarpium, is the germen of the pistil enlarged, as the seeds increase in size, and approach nearer perfection. (Plate I.) The seed vessel is divided into seven kinds:

Capsule, as in poppy and convolvulus;

Pod, as in wall-flower and honesty;

Legume or shell, as in pea and broom;

Berry, as in elder and gooseberry;

Pome, as in apple and pear;

Drupe, as in cherry and peach;

Cone, as in fir and pine.

The seeds, or fruit, resemble the eggs of animals, and are the essence of the fruit, containing the rudiments of a new vegetable. The formation of the seed is variously adapted to its purpose, and is composed of several parts: 1st. The heart; this is the principle of life in the future plant, contained within the lobes: it consists of two parts; the plume, which ascends and forms the future stem; and the beak, which descends and becomes the root. 2dly, The side lobes; these supply the heart of the seed with nourishment, till it is capable of extracting support from the

the earth. In many plants the lobes ascend in the form of leaves, and are called seed or radicle leaves; but in some they perish beneath the surface, without appearing above ground. 3dly, The Scar; is an external mark, where the seed was fastened within the seed vessel. 4thly, The seed-coat is a proper cover to some seeds. It is of various texture and consistence in different individuals. Sometimes the seed is crowned with the cup of the flower, and sometimes it is winged with a feather, or with a thin expanded membrane, which assists the wind to waft or disperse it to a distance. The seed contains the perfect plant in embryo, though, in most instances, too minute to be discerned by our organs of sight; but if the seed of a bean or an acorn be sufficiently soaked in warm water, the form of the future plant may be plainly perceived.

The base, or receptacle (*g*) is that part by which the whole fructification is supported; in many flowers it is not very striking, but in others it is large and remarkable, as in the cotton *thistle* (*h*). The artichoke will also furnish us with an example: take away the empalement, blossoms, and bristly substances, and the part remaining is the receptacle, which we eat, and call the bottom.

It

It remains for me to describe the nectarium, nectary, or honey cup, an appendage with which some flowers are furnished, containing a small quantity of sweet, honey-like juice, from which the bees collect their rich treasures. It is very conspicuous in some flowers; as the nasturtium, crown imperial, columbine, and larkspur; but less visible in others, and in some appears to be entirely wanting. In the dove-footed cranes-bill there are five yellowish glands (i), which serve as a nectary. The use is supposed to be that of a reservoir, for the nourishment of the tender seed bud.

I am fearful, my dear sister, that you are fatigued with these tedious definitions and descriptions of parts; to me they have been rendered more agreeable, as I have become acquainted with them from visible objects. I hope to participate this pleasure with you in degree, by exemplifying them in some individual flowers, which you may examine by yourself; but I shall defer this till my next letter, and conclude affectionately yours.

FELICIA.

LETTER

LETTER IV.

Shrubbery, February 24.

THE further I advance in my new study, the more pleasure I take in it, and should value it as an important addition to the number of my innocent enjoyments, if partaken with you, my beloved Constance. Though far separated from each other, I am still desirous of associating with you, as much as the mode of communication will permit; in the delight I feel in examining pointals and stamens. My morning and evening gambles are devoted to this pursuit, nor will Mrs. Snelgrove permit me to pass those hours in mere amusement, but leads me, by her amiable reflections, to consider these pleasing objects not only in a botanical view, but by pointing out the peculiar uses of the different parts of their structure, to perceive and admire the proofs of Divine Wisdom exhibited in every leaf, and in every flower. Common beholders see these things constantly without observing them; how happy am I to have an instructress and guide, who teaches me to use my eyes, and exert those faculties which nature has bestowed upon me. The flowers which I have selected as examples,
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for your examination, to render you perfect mistress of the parts, are the Crown Imperial, the Stock Gilliflower, and the Pea; the last is chosen on account of the wonderful means used in its construction, for the preservation of those parts necessary to preserve the fruit or seed. They are not yet in season. The first will soon appear; but you must wait patiently for the others, till the time of their blooming arrives, which will afford you the advantage of watching their progress, from the first appearance of the bud to the perfecting the seeds; nor can you judge accurately of several of the parts, but by this daily examination, as they change their form and appearance in different stages of the maturity of the flower. Gather the crown imperial, as soon as you perceive one blown; if you observe it closely, you will find that it has no cup or empalement; pull off the beautifully coloured scarlet, or sometimes yellow, petals, which form the corolla, one by one, and you will find that there are six of them. The corollas of many flowers are formed of one petal, as the Canterbury Bell, and are, on that account, called Monopetalous. But those that have more petals than one in their corollas, are termed Polypetalous. Observe a sort of little column, rising exactly in the middle of the corolla, and pointing upwards. This taken in its whole, is the pointal, but by a nice
nice

nice inspection, you will find it divided into three parts. The oblong, three-cornered, swollen base, which is the germ or ovary; the style or thread placed upon this, crowned by the stigma with three notches. Between the pointal and the corolla, six other bodies will claim your notice, which you will readily guess are the stamens, composed of filaments and anthers. Continue your visits to some other individual flower of the same kind, till the petals wither and fall off, and you will perceive that the germ increases, and becomes an oblong triangular capsule, within which are flat seeds in three shells. Behold the seed vessel under the form of this capsule. I had like to have forgotten to mention the honey-cup, which may be found at the bottom of the petals, in the form of a little hole. The willow wren creeps up the stems of this plant, and sips the drops of honey as they hang from the petals. After having carried you through the various parts of a Crown Imperial, I will introduce a Stock Gilliflower to your acquaintance, which I hope will afford you as much entertainment as the flower already examined. It is necessary that I should remark, that our stock must be a single one. Those fine purple double stocks that we prized so highly last summer, would have been totally disregarded by a botanical student, who considers all
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double flowers, either as the sport of nature, or the effect of art, and consequently improper for his investigation. In the examination of this flower, the first thing that you will see is the calyx, an exterior part, which was wanting in the Crown Imperial. In the stock, it consists of four pieces, which we must call leaves, leaflets, or folioles, having no proper name to express them by, as we have of petals, for the pieces that compose the corolla. These leaflets are commonly unequal by pairs. That is, there are two opposite and equal, of a smaller size; and two others also opposite and equal, but larger. This calyx contains a corolla, composed of four petals. I say nothing of their colour, because that makes no permanent part of their character. Each of these petals is fastened to the receptacle, or bottom of the calyx, by a narrow pale part, called the claw of the petal, and this spreads out over the top of the calyx, into a large, flat, coloured piece, distinguished by the name of lamina, or the border. Admire the regularity of the corolla of the flowers of this tribe. The petals grow generally wide of each other, and exactly opposite to one another, forming a figure resembling that of a cross, which has given them the name of cruciform, or cross-shaped. The petals of the corolla, and the leaflets of the calyx, are situated alternately; and this position prevails in all flowers,

flowers, in which is a correspondent number of petals and leaflets. In the centre of the corolla is one pistil or pointal, long and cylindric, chiefly composed of a germ, ending in a very short style, and that terminated by an oblong stigma, which is bifid, or divided into two parts, that are bent back on each side. It remains now to speak of the stamens: there are six of them, two, shorter than the other four, opposite to each other; these are separated by the rest, as are also the others in pairs. When the corolla withers, the germ grows considerably in length, and thickens a little as the fruit ripens; when it is ripe, it becomes a kind of flat pod, called silique. This silique is composed of two valves, each covering a small cell, and these cells are divided by a thin partition. When the seeds are ripe, the valves open from the bottom upwards, to give them passage, and remain fast to the stigma at top. Then you may discover the flat round seeds arranged along each side of the partition, and you will find that they are fastened alternately, to right and left, by a short pedicle, or footstalk, to the sutures or edges of the partition. The great number of species in this class, has determined botanists to divide it into two sections, in which the flowers are perfectly alike; but there is a material difference in the fruits, pericarps, or seed vessels. The description
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of the Pea, will enlarge my letter to an unreasonable length, and as I am tired, and suppose that you must be so likewise, I will defer it to my next. Adieu, dear sister; say every thing for me, to my aunt and cousins, that is kind and affectionate, and believe me ever your

FELICIA.

LETTER V.

Shrubbery, March 1.

IT is with renewed pleasure I devote the present half hour to your service, since you assure me, that my letters contribute to your amusement, and that you pursue the same object that occupies me daily, from the hints I have given you. I wish you had a better guide, that could satisfy your enquiries, and animate your industry by superior skill; affection and desire to please, will stimulate me to repeat Mrs. Shelgrove's lectures accurately. I wish I may be able to give you a clear idea of what I describe; but, as I find it difficult to express forms and shapes by writing,

writing, I believe I shall be obliged to have frequent recourse to my pencil, which will represent, in a more lively manner, the pleasing objects of our present researches. In order to assist you in the examination of the minute parts of small flowers, it will be necessary to provide a magnifying glass, a needle, lancet, and a pair of small scissars, to render the dissecting them easier; for many of their parts are too delicate to be handled, for which reason a pair of small nippers will be a useful addition to the instruments that I have already named. Although I have wandered far from the subject, I have not forgotten my promise, of describing the curious mechanism employed in the structure of the pea flower.

On examining this elegant and wonderful blossom, you will observe that the calyx is of one piece, divided at the edge into five segments, or distinct points, two of which are wider than the other three, and are situated on the upper side of the calyx, whilst the three narrower ones occupy the lower part. The corolla is composed of four petals, the first is broad and large, covering the others, and standing, as it were, on the upper part of the corolla, to defend and shelter it from the injuries of the weather, in the manner of a shield; by way of pre-eminence, it is called the Standard, or Banner. In taking off the standard, remark how deeply it is inserted on each

each side, that it may not easily be driven out of its place by the wind. The side petals, distinguished by the name of wings, are exposed to view by taking off the banner. They are as useful in protecting the sides of the flower, as the banner is in covering the whole. Take off the wings, and you will perceive the keel, called so on account of its fancied resemblance to the shape of the bottom of a boat; this incloses and preserves the centre of the flower from harm, which its delicate texture might receive from air and water. If you are curious to examine the contents of this little casket, slip the keel gently down, and you will discover a membrane terminated by ten distinct threads, which surround the germ, or embryo of the legume or pod. Each of these threads or filaments is tipped with a yellow anther, the farina of which covers the stigma, which terminates the style, or grows along the side of it. The filaments form an additional defence to the germ, from external injuries. As the other parts decay and fall off, the germ gradually becomes a legume or pod. This legume is distinguished from the silique of the cruciform tribe, by the seeds being fastened to one side only of the case or shell, though alternately to each valve of it. Compare the pod of a pea and a stock together, and you will immediately perceive the difference. The footstalk
which

which supports this flower is slender, and easily moved by the wind. In wet and stormy weather the pea turns its back to the storm, whilst the banner unfolds the wings, by closing about them, and partly covers them; they perform the same office to the keel, containing the essential parts of the fructification. Thus is this flower curiously sheltered and defended from its natural enemies, rain and wind; and, when the storm is over, and fair weather returns, the flower changes its position, as if sensible of the alteration, expands its wings, and erects its standard as before. Wonderful are the means of preservation used by the all-wise Creator to defend the tender and important parts of the fructification of plants from injury; but he seems to have provided, in an especial manner, for the security of those which serve as nourishment to men and animals, as does the greater part of the leguminous or pulse kind. I imagine, by this time, that you are pretty well acquainted with the several parts that compose a flower, and would recognize them, though in an individual that was an utter stranger to you. Confirm your knowledge by practice, and do not suffer a day to pass without amusing yourself in dissecting some flower or other. When you are perfectly acquainted with this entrance of the science, Mrs. Snelgrove says, that I may proceed to give you a

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sketch of the arrangement and classification of plants, for it is by method only that it is possible to obtain a knowledge of so many particulars. Botany would be indeed a most fatiguing and almost unattainable science, were we obliged to learn the peculiarities of every plant, one by one; but the difficulty ceases, or at least is greatly diminished, by classing those together, in which there is a similarity in some one point. Eminent naturalists have at different times exerted their talents to perform this task. Tournefort is a name that was highly distinguished on this list, before the time of Linnæus, whose superior genius has raised him above all his predecessors; his system is now universally adopted. As it will furnish matter for several letters, I shall not enlarge upon it at this time, but proceed to relate some anecdotes concerning this great man, that I think likely to afford you entertainment. Charles Linnæus was a native of Sweden, and the son of an obscure clergyman in that country; his father was a great admirer of the vegetable productions of nature, and adorned the environs of his rural mansion with the natural produce of the neighbouring fields. Young Linnæus caught the enthusiasm, and early imbibed the same taste, with such warmth, that he was never able to bend his mind to any other pursuit. His father intended to bring him up to the church, but he showed such

such a dislike to theological studies, to which his nature was averse, that his relations, angry and disappointed at his want of application, by way of punishment, purposed to bind him apprentice to a shoe-maker; but an over-ruling Providence destined him to fill a more noble and distinguished walk in life. A physician, named Rothman, observing him to be a lad of genius, compassionated his situation, and relieved him from it, by taking him into his own family, and instructing him in the science of medicine. By accident he lent him Tournefort's Elements of Botany to read, which renewed his former taste for the productions of Flora, and decided the cast of his future character. From that time he devoted all his leisure to his favourite study, and by the lustre of his abilities, drew the attention of some of the most learned men in Europe, who encouraged and patronised him in the prosecution of that amiable and interesting pursuit, to which he had devoted himself. Botany was in an imperfect state when he undertook to form a new system, which he effected so excellently, that it has immortalized his name; and although it may probably receive improvement from some future naturalists, it is never likely to be superseded. The studies of Linnaeus were not wholly confined to botany. He formed the present classification of most other branches of

natural history, and, by his judicious arrangements, has rendered the acquisition of the knowledge of nature easier to the student than it was before his system was invented. It is late, and I am obliged to lay aside my pen. Farewel.

FELICIA.

LETTER VI.

DEAR SISTER,

Shrubbery, March 6.

I AM fearful, lest by this time you are wearied with the minute descriptions of the separate parts of flowers and plants, and that you begin to wish for something more amusing. Botany, like all other sciences, has its elements, which must be patiently learned by the pupil before sufficient knowledge can be obtained to enjoy the most pleasing parts of it. I have already hinted the necessity of forming some system that may reduce the innumerable individuals of the vegetable kingdom to the compass of human memory and comprehension. All the known vegetable productions, upon the surface
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of the globe, have been reduced by naturalists to Classes, Orders, Genera, Species, and Varieties. The Classes are composed of Orders; the Orders are composed of Genera; the Genera of Species; and the Species of Varieties. Let us endeavour to obtain a clearer idea of Classes, Orders, &c. by comparing them with the general divisions of the inhabitants of the earth.

Vegetables resemble Man;
 Classes, Nations of Men;
 Orders, Tribes, or Divisions of Nations;
 Genera, the Families that compose the Tribes;
 Species, Individuals of which Families consist;
 Varieties, Individuals under different appearances.

Do not think, dear sister, that I am capable of methodising so accurately, without the kind assistance of one, who superintends my letters, and points out what I should write; it is not necessary to say, that Mrs. Snelgrove is that attentive, affectionate friend, who will not allow me to do any thing without some degree of regularity. Many great men, as I told you in my last, have formed systems after different plants. Those of Tournefort and Linnæus are most esteemed: both are ingenious; but as that of Linnæus has superseded all others, it will not be

necessary to confound your memory with any other, his being the one universally adopted ; it is that in which it is proper to be completely instructed.

Linnaeus, dissatisfied with every system invented before his time, undertook to form a new one, upon a plan approaching nearer to perfection, and depending on parts less liable to variation. The stamens and pointals are the basis of his classification. He has divided all vegetables into twenty-four classes. These classes are subdivided into nearly one hundred orders ; these orders include about two thousand families or genera ; and these families about twenty thousand species, besides the innumerable varieties produced by the accidental changes of cultivation, soil, and climate. As you have acquired accurate notions of stamens and pistils, you will find but little difficulty in making yourself mistress of the classes and orders ; the former depending principally upon the number, the length, the connection, or the situation of the stamens ; the latter are founded in the thirteen first classes, on the number of the pointals ; in the others, on circumstances to be hereafter explained. The characters of the genera are marked from some particulars in the flower, unnoticed in the definitions of the classes or orders. The generic description includes *all* the most obvious appearances

pearances in the flower. In a science depending so much on memory and minute definitions, it is advisable to proceed step by step, and make yourself perfectly acquainted with the classes, before you advance to the orders. Should you gather a flower, in order to know to what class it belongs, observe first, whether it be a perfect flower, containing both stamens and pointals; if that be the case, examine whether the stamens are entirely separate from the pointal and each other, from top to bottom. If you find that they are perfectly distinct, and of equal height when at maturity, and not so many as twenty, the number of them alone will be sufficient to determine the class.

Those that have one stamen will belong to the first class, Monandria.

Those that have two, to the second, Diandria.

Those that have three, to the third, Triandria.

Those that have four, to the fourth, Tetrandria.

Those that have five, to the fifth, Pentandria.

Those that have six, to the sixth, Hexandria.

Those that have seven, to the seventh, Heptandria.

Those that have eight, to the eighth, Octandria.

Those that have nine, to the ninth, *Enneandria*.

Those that have ten, to the tenth, *Decandria*.

Thus far, it is easy to arrange each flower under its proper class, as you have nothing farther to do but to observe the four above-mentioned peculiarities, and to count the stamens, and refer them to their respective classes, according to their number. The distinctions in the remaining classes I shall point out in their proper order. The names of the classes are composed of two Greek words, ingeniously contrived to express the peculiarities of each class, and absolutely necessary to be learned perfectly by heart; which cannot be considered as a difficult task, as there are but twenty-four of them, and by far the greater number terminate in the same word, *andria*.

Flowers growing wild, without culture, are the most suitable for examination, because those that are domesticated in the rich soil of our gardens, are frequently transformed into something very different from what nature made them, by change of nourishment, &c. It will be proper to extend your observation to several flowers of the same class, as it sometimes happens that the number of the stamens varies from accidental causes, and if the flowers are disposed in spikes or bunches, the terminating one should be preferred.

fired. But there is a beautiful regularity in most of Nature's works, that may assist you on this occasion. If the calyx of your flower be divided into five segments, and the corolla be formed of five petals, or divided into five parts, although you find six or seven stamens, it is more than probable, that, on further inspection, you will find that it belongs to the fifth class, Pentandria. It is time to conclude this digression, and proceed to the eleventh class, Dodecandria, or twelve stamens. Some flowers in this class contain fewer, and others more, than the specified number. All plants are included in it, that have any number of stamens, from eleven to nineteen inclusive, provided they are disunited. Let us search then, for some more invariable characteristics to distinguish this class, and we shall find that the stamens are all fixed to the base or receptacle. In the twelfth class, Icosandria, there should be twenty stamens, or about that number, standing upon the sides of the cup, and sometimes partly on the blossom; whereas the former and the following classes are marked by their standing on the receptacle. Observe, as an additional distinction of this class from the next, that the cup consists of one concave leaf, and that the petals are likewise fixed by their claws to the sides of the cup.

Many stamens, from twenty to any number,

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are found in the thirteenth class, *Polyandria*, fixed on the base or receptacle. The flowers of this class have either a calyx, consisting of several folioles, or none at all.

In the preceding classes, no attention has been paid to the length of the stamens, but they have been supposed to be all nearly equal in that respect. The distinctive marks of the next two classes depend chiefly on that circumstance.

The fourteenth class, *Didynamia*, or two powers, will present you with flowers containing four stamens, ranged in one row, the inner pair shorter than the outer one. The essential marks of this class consist in the proportionable arrangement of four stamens, as I have already expressed, accompanied with one pointal, and invested with an irregular *Monopetalous* corolla. Those flowers that are called *labiate*, or lip-shaped; as well as the *personate*, or masked flowers; are included in this class: those of the first kind have two lips, the one projecting over the other, forming, as it were, a shelter to the parts of the fructification from rain, &c. The lips are generally closed in the *personate* corollas, and entirely conceal the stamen and pointal from sight.

Class the fifteenth, *Tetradynamia*; the meaning of this long word is, the power of superiority of four, and accordingly its character is distinguished by six stamens, four of which are long,
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and the remaining two are short. It is chiefly composed of cross-shaped flowers, with which you are already pretty well acquainted. The five following classes are not distinguished by the number of the stamens, but by their situation. The union or adhesion, either of their anthers or filaments to each other, or to the pointal, decides to which of them they belong.

The sixteenth class, *Monodelphia*, or one brotherhood. In this class the filaments are united at the bottom, but separate at the top, as in the Mallow and Geranium.

The seventeenth class, *Diadelphia*, or two brotherhoods. The filaments of these flowers are also united at bottom, not into one bundle or brotherhood, but into two; and consists of the papilionaceous or butterfly-shaped flowers.

The eighteenth class, *Polyadelphia*, or many brotherhoods. The filaments in this class are united at the bottom only, into three or more bundles or brotherhoods.

The nineteenth class, *Syngnesia*, is composed of flowers generally* compound, the essential character of which consists in the anthers being united, so as to form a cylinder; and a single seed being placed upon the receptacle under

* If the order *Monogamia* of this class be incorporated with *Monogynia*, as is now generally done, the class is wholly composed of compound flowers.

each floret, perhaps, an example will give you the clearest idea of a compound flower; the Thistle is one ready at hand, being composed of small flowers, or florets, sitting upon a common receptacle, and enclosed by one common envelope.

The twentieth class, Gynandria. Many stamens attached to, and growing upon the pointal itself. Hitherto our attention has been confined to such flowers only as are termed complete, having both stamens and pointals on the flower. But the next three classes will furnish us with examples of those which have only the one or the other in the same flower.

The twenty-first class, Monœcia, or one house. The flowers of different kinds being produced in the same habitation, or on the same individual plant. But in the next, or twenty-second class, Diœcia, or two houses. The different kinds of flowers, which are distinguished by the names stameniferous, or stamen bearing; and pistilliferous, or bearing pistils; are produced by different trees or plants of the same species.

The twenty-third class, Polygamia, provides for the only remaining case that can possibly happen, and consists of flowers with stamens and pointals in separate flowers, as well as both in the same flower, or one on different plants.

The twenty-fourth class, Cryptogamia. Plants whose

whose flowers are not perceptible by the naked eye, though there is good reason to believe that no plant exists without the essential parts that constitute the flower. The lowest kinds of vegetables are the objects of this class, as Ferns, Mosses, Sea Weeds or Thongs, and Funguses.

To these twenty-four classes Linnæus has added the Palm trees, which do not fall under the description of any of the classes. He calls them Princes of India, bearing their fructification on a spadix or receptacle, within a spathe or sheath. Remarkable for their prodigious height, distinguished by an unvaried, undivided, perennial trunk, crowned at top by an evergreen tuft of leaves, and rich in abundance of large fine fruit. But since the time that Linnæus wrote, more certain knowledge of them has been obtained, and many of them are arranged in the sixth class. If you have patience and perseverance to learn the contents of this letter, you will deserve to be chosen queen of the May.

FELICIA.

LETTER

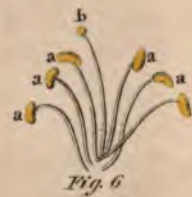
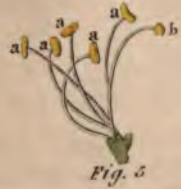
LETTER VII.

Shrubbery, March 26.

I have been in no haste to burden you, my dear Constance, with another letter, till I thought that I had given you time for digesting the last, the subject of which is too important to the science in which you are engaged to be slightly passed over. When you find yourself perfect in your knowledge of the classes, or larger divisions, this letter is intended to supply you with fresh employment, by making the distinctions of the orders that compose them. The orders of the first thirteen classes are founded wholly on the number of the pointals, so that, by adding *gynia* instead of *andria*, to the Greek words signifying the numbers, you will easily obtain a knowledge of them, as Monogynia, one pointal, Digynia, two pointals; Trigynia, three pointals; Tetragynia, four pointals, and so on. In those cases where the pointals have no apparent styles, the stigmas are to be numbered, which generally adhere to the capsule like small protuberances, as may be observed in the flowers of the Poppy.

There is no occasion to count the pointals in the fourteenth class, Didynamia, because all the
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flowers of the Ringent tribe, including both the labiate and personate flowers, have but one pointal: but there is another obvious difference that presents itself, as an assistant in discriminating the orders of this class; for most of the plants that have a labiate flower have four naked seeds at the bottom of the calyx, and the personate flowers are succeeded by a capsule, containing many small seeds. From this distinction arises an elegant, easy, and natural division of the fourteenth class into two orders: *Gymnospermia*, comprehending such as have naked seeds; and *Angiospermia*, consisting of those that have their seeds covered, or inclosed in a capsule. The fruit supplies us with marks for the subdivision of the next class, *Tetradynamia*, in which the flowers also have but one pointal. It is divided into two orders, called *Siliculosa* and *Siliquosa*, according as the seed vessel is a silicle or silique. The plants of the first order have a silicle, or short roundish seed-vessel, or pericarp. Those of the second contain their seeds in a silique, or long slender pod. In the sixteenth, seventeenth, and eighteenth classes, the orders are distinguished by the number of the stamens.

The chief difficulty, with respect to the orders, lies in the class *Syngnesia*. This class comprehends those flowers that are called compound, of which I gave you some notion in treating

treating of the classes. Now, if you examine these floscules, or florets, nely, you will perceive that they have sometimes both stamens and pointal; but you will also discover that some have stamens only, whilst others are furnished with a pointal alone; and, lastly, that there are floscules without either the one or the other. Let us distinguish the first of these by the term perfect floscules; the second by that of stameniferous; the third we will call pistilliferous; and the fourth neuter floscules. These variations require exact attention, because on them, and on the form of the florets, Linnæus has founded the four first orders of this class. Polygamia is the family name applied to all the orders; it is used in opposition to Monogamia, (*πολυς* signifying many, and *μονος* one,) and implies that there are many florets inclosed within one common calyx, which coincides with the idea of a compound flower. The first order is called Polygamia *Æqualis*; the peculiar name *æqualis* means regular or equal, and infers that the floscules are similar, and all furnished with both stamens and pointals, as in the Dandelion. In the second order, Polygamia *Superflua*, all the florets of the disk, or centre of the flower, are perfect; those of the ray or circumference, pistilliferous; both of them produce seed: the Daisy is a familiar instance. The third order of the

the class, Syngnesia, is entitled *Polygamia Frustranea*. The florets in the disk or centre are perfect, and produce seed, whilst those of the ray are imperfect, and therefore frustrate or barren; from which circumstance the order takes its name: example, Bluebottle. The situation is reversed in the fourth order, *Polygamia Necessaria*; for the florets in the disk, though apparently perfect, are not really so, and therefore produce no perfect seed; but the fertility of the pistilliferous floscules in the ray compensate for the deficiency of those in the centre of the flower, as is seen in the Marygold. The fifth order, *Polygamia Segrata*, has many floscules inclosed in one common calyx, yet each of the floscules has one appropriate to itself: Globe Thistle supplies me with a beautiful example. The orders of the three following classes, Gynandria, Monœcia, and Dioœcia, being founded upon the stamens, and taking their names from the preceding classes, according to the number, union, or disunion of the stamens in the respective flowers, require no particular elucidation.

It will be needless to burden your memory, my dear sister, with the distinctions of the orders of the class *Polygamia*, as it is omitted by the later botanists, and the flowers which composed it are incorporated with the other classes.

The last class, *Cryptogamia*, consists of plants, whose

whose parts of fructification are either obscure or very minute, which prevents the possibility of arranging the orders according to the number and situation of the stamens and pointals. The peculiarity of structure of the plants of this class distinguishes them sufficiently from all others. It is naturally divided into four orders: first Filices, or Ferns; second, Musci, or Mosses; third, Algæ, or Sea Weeds; and fourth, Fungi, or Funguses. The ferns comprehend all plants that bear their seeds in the back, or edges of the leaf. The moss kind forms the second order. The third includes the lichens, fuci, and many others, whose essential parts are too minute or obscure for investigation. If the funguses have any fructification, it is imagined to be underneath, in the gills, pores, &c. Thus we have, at length, reached the end of the classes and orders, which I think will supply our walks with amusement for the whole summer; and, by forming a taste for this delightful part of nature, lay a foundation that will continue to furnish new and interesting objects to the end of our lives. I cannot wonder that a country-residence is disagreeable to those who have no relish for the objects it presents; but it may well be preferred by persons of true taste and observation, who clearly perceive the traces of infinite Wisdom and intelligence in the structure of every leaf

leaf and every blossom. May rural pleasures
always suffice to render you cheerful and happy.

FELICIA.

LETTER VIII.

Shrubbery, April 2.

WHENEVER you set out on a botanical excursion, remember to put your magnifying glass and dissecting instruments into your pocket, that you may not be obliged to neglect those flowers that are small, for want of this precaution. Always gather several flowers of the same kind, if possible; some just opening, and others with the seed-vessels almost ripe: and as I intend to select our examples from plants of British growth, you must seek for them growing wild in their native fields; nor confine your walks within the limits of a garden wall. Thus I hope you will obtain health, and a knowledge of vegetables at the same time. That nothing might be left undone by Linnæus, the great master of method and arrangement, to render the acquisition

acquisition of his favourite science easy, he has divided the orders, when numerous, into several divisions, each including one or more genera, which is a means of diminishing the pupil's labour. Let us suppose, that you have a plant under observation, belonging to an order that contains a great number of genera: you are confused, and know not to which to apply it. But on remarking these divisions, you are enabled to place it among a few of its brethren, there remains but little difficulty to discover its peculiar marks, and assure yourself of the identical plant. The first class, Monandria, contains but two orders, both depending upon the number of the pointals. Most of these plants are natives of India. Our ditches and muddy ponds, however, produce one example, that you may easily procure. It is called Mare-tail (*Hippuris*) has neither empalement nor blossom. Its single stamen grows upon the receptacle, terminated by an anther slightly cloven, behind which you will find the pointal, with its awl-shaped stigma, tapering to a point. The stem is straight and jointed, and the leaves grow in whorls round the joints; at the base of each leaf is a flower, so that the number of flowers and leaves is equal. Its season of flowering is the month of May. As there are but few objects of native growth

to

to arrest our attention in this class, we will proceed to the next.

The Privet (*Ligistrum*) is a shrub common enough in the hedges in many parts of England, and when mixed with other shrubs, makes a pleasing variety in our gardens. It bears a white blossom, and generally flowers in June. It has a very small tubular calyx of one leaf, its rim divided into four parts. The blossom is also monopetalous, and funnel-shaped, with an expanded border, cut into four egg-shaped segments. Its stamens are two, which determine it to belong to this class, placed opposite to each other, and nearly as long as the blossom. The seed-bud is roundish, the style short, terminated by a thick, blunt, cloven stigma. The seed-vessel is a black berry, containing but one cell, which incloses four seeds. The leaves grow in pairs, and are sometimes variegated with white or yellow stripes. The berries are useful to the dyers, as they give a durable green colour to silk or wool by the addition of alum. In the second division of this order is a genus, the Latin name of which is *Veronica*, but commonly known by that of *Speedwell*. There are a great many species of it, which has induced Linnæus to treat it in the same manner as the orders, and to divide it into three principal divisions. First, Flowers growing in spikes. Secondly,

condly, Flowers in broad bunches. Thirdly, Fruit-stalks with one flower. The monopetalous wheel-shaped corolla, divided into four segments, the lowest of which is narrower than the rest, and that opposite to it the broadest; easily distinguish this genus, as well as the heart-shaped, flattened capsule with two cells. Several of the species are cultivated, and increase the beauty of the flower-beds in the early part of the summer. You will soon be tired of these descriptions, if you do not unite them to the living objects. Search for some others in the same classes, and oblige me with your account of them. In this manner we may contribute to each other's amusement, though we cannot enjoy each other's company. Yours, with warm affection,

FELICIA.

LETTER IX.

Shrubbery, April 15.

HOW often have we walked through the meadows and pastures, without opening our eyes to the wonders they contain! We were, indeed,

indeed, delighted with carrying a bouquet of the gayest flowers we could collect, and sometimes admired a piece of grass, for the beauty of its pendant head. But we little thought, that every single blade of these apparently insignificant plants, as we have been accustomed to consider them, bears a distinct flower, perfect in all its parts; nay, more complete than the fragrant Lily or the gaudy Tulip, and only requires to be nicely viewed to excite our value and admiration. This humble tribe is extremely numerous, and, like modest merit in other situations, of most extensive utility. There are upwards of three hundred species, but as they have been scarcely noticed till within twenty or thirty years, we may believe that time will improve our knowledge of their properties and structure. Dr. Withering says, "that the leaves furnish pasturage for cattle; the smaller seeds are food for birds, and the larger for man; but some are preferred to others: as the Fescue for sheep; the Meadowgrass for cows; the Canary for small birds; the Oat for horses; the Rye, Barley, and Wheat, for men; besides, a variety of beautiful insects derive their nourishment from them:" and if we enumerate the remote benefits that accrue from them, their consequence increases to an extraordinary height. What may be called the most important articles of both food

food and clothing, are derived from this unnoticed and neglected tribe. Bread, meat, beer, milk, butter, cheese, leather, and wool, and all the advantages produced from the use of cattle, would be lost without them.

But I think I hear my dear sister exclaim, you are very earnest in setting forth the praises of grasses, and, in order to enhance their dignity, you rank the various kinds of corn among them. But you will soon be convinced, when I have given you their general character, that they are all of one family. Observe their whole appearance: you know a blade of corn or grass, at first sight, from every other plant that grows near them. What is it that distinguishes them? Their simple, straight unbranched stalk, hollow and jointed, commonly called a straw, with long, narrow, tapering leaves, placed at each knob or joint of the stalk, and sheathing or inclosing it, as if by way of support: their ears or heads consist of a husk, generally composed of two valves, which form the empalement, the larger leaflet hollow, the smaller flat; within which is what may be termed the blossom, which is also a husk of two valves, dry and shining: these minute flowers are furnished with a honey-cup; but it requires very good eyes, or a glass, to discern it. The fructification of grasses is best observed when they are nearly ripe, and their
husks

husks expanded, which renders their three slender filaments, tipped with large, oblong, double anthers, easily perceptible: these filaments play freely about upon the slightest motion, and their number, three, will leave you at no loss to place these plants in the third class, Triandria; and the two pointals, reflected, or turned back, with their feathered stigmas, determine them to belong to the second order of that class: seed-vessel they have none, but each seed is inclosed either by the blossom or empalement. As they ripen the husks open, and, if not timely gathered, the seed falls to the ground, which is one among many means used for the increase and propagation of vegetables. They have fibrous roots, something like a bundle of strings. The extraordinary precautions displayed in the preservation of those plants, that are chiefly destined to sustain men and animals, was remarked in the delineation of the papilionaceous tribe; and here again the same care is conspicuous, and calls for further gratitude and admiration. What a dreary habitation would this earth be, were it destitute of its verdant covering, so soft to our feet, and refreshing to our sight! But when we reflect, that this delightful carpet, which is spread every where around us, is the prey of almost every animal that approaches it, how much is to be apprehended for its safety. But

D. Providence

Providence has ordained, with the utmost wisdom and beneficence, that the more the leaves are cropped, the faster the roots increase; and, what is still more wonderful is, that the animals that browse on grasses, though left at full liberty in the pasture, leave the straws which support the flower and the seed untouched; and what more clearly manifests that these things are not the effects of chance, but the result of Divine Intelligence, is that those species which flourish on the tops of mountains, where the summer heats are not sufficient to bring their seeds to perfection, are generally increased by the root, or winter-buds, and do not depend upon the seed for increase. Linnæus, according to his usual method, has arranged this numerous order into several divisions, marked by their manner of growth; they are first divided into those that bear spikes, and such as are produced in panicles: a panicle is a kind of loose bunch, in which the flowers grow irregularly, and rather scattered. The three first divisions include those that are produced in this manner, and are distinguished by the number of flowers in each empalement.

The first division has but one flower in each cup;

The second two; and

The third several.

The fourth division consists of all those that grow in spikes or heads.

Besides

Besides the plants that fall under this order, there are others of the grass kind, that differ in some of their characters, and are referred to their proper classes and orders. Vernal Grass has only two stamens, and consequently ranks in the class Diandria. We are indebted to this grass for the delightful fragrance of the new-mown hay. The various disposals of the stamens and pointals on one plant in Hard Grass and Soft Grass, exclude them from this class, though, in other respects, they partake of the general character. I have selected the Panic Grass as an instance of the first division. It is known by the following distinctions: its husk has three unequal valves, nearly egg-shaped, the smallest of them standing behind the other two, containing one floret, which consists of two valves, not so large as those of the empalement. The stamens are three; short, hair-like, and tipped with oblong anthers. The seed-bud is roundish, and the two pointals crowned with downy summits. Each blossom incloses a roundish seed, flattened a little on one side. In the next division there are but two genera, Hair Grass and Rope grass; which we will pass over, as there is nothing particularly striking in their manner of growth. Quake Grass, Meadow Grass, Fescue, Brome Grass, Oat, and Reed, are all pretty common, and fall under the third division. The

genera are distinguished chiefly by the different form of the corollas and the shape of the valves : there are many species of each genus ; but I must omit many particulars worthy of your notice, as my letter is already of an immoderate length, and I have not yet touched upon the principal kinds of corn. The essential character of the Oat, consists in the jointed twisted awn, or beard, that grows from the back of the blossom. It is remarkable for the elegance of its panicle, and the flexibility of the fruit stalk, which turns with the slightest breath of wind. Among the Reeds, the Sugar Plant is included, as well as the Bamboo, which grows in the East Indies. It is time to hasten to the fourth and last division, which contains the individuals of this family, that are most important to man, as Rye, Barley, Wheat, Darnel, and Dogstail. These are distinguished from the former divisions, by always growing in a spike or ear.

Rye has two flowers, included in the same envelope.

Wheat has three.

Barley has a six-leaved involucre, containing three simple flowers.

The other two are contained in the involucre of a single leaf, and their flowers are compound.

In Rye, there frequently is a third floret upon a fruit-stalk, between the two larger ones, which have no stalk. In some species of Barley, all the three florets which grow together have both stamens and pointals; but in others the middle florets alone are furnished with those parts, the lateral florets having only two stamens. The exterior valve of the corolla in Wheat is sometimes bearded, but not always. The calyx mostly contains three or four flowers, and the middle one is often imperfect. The filaments in Rye and Wheat are long, and hang out beyond the corolla, which exposes these grains to more injury from heavy rains than that of Barley, in which the filaments are shorter. Corn is the produce of cultivation in all countries where it grows; and, what is extraordinary is, that it is not known of what country it was originally a native. It differs in excellence, according to the soil and temperature. Wheat prefers a country that is rather warm, and flourishes most in the southern parts of the temperate zone, rejecting both extremes of heat and cold. This letter will supply you with employment till the hay season is over. Adieu! Ever yours,

FELICIA.

LETTER X.

DEAR CONSTANCE,

Shrubbery, May 8.

THOUGH the grasses are so numerous, and form so large a part of the third class, they do not exclude others from it, that are worth notice, either on account of their beauty or peculiarity of construction. The majestic tribe of Flag flowers; and the modest Crocus, the welcome harbinger of spring; with some others; belong to it. They are characterised by a spathe or sheath; instead of an empalement. The corolla either consists of six petals, or is divided so deeply as to appear as if it were so. The petals of the different species of Iris have a peculiar construction, which claims your notice; the three outward ones are reflected or turned back, the other three stand upright, and are sharper; though they appear as if they were separated, they are all connected together by the claws. In the centre of the flower there seems to be three other petals, which in reality are nothing but the pointal, divided into three parts: it has a very short shaft, but the stigma is large, broad, and reflected; underneath each division lies concealed a single stamen, terminated by its straight,

straight, oblong, flattened anther. Some of the species are adorned by a kind of fringed beard along the middle of the reflex petals ; but this is not common to them all. The capsule is beneath the flower, and agrees in its form and divisions with the number of the stigmas, being triangular ; though there are some kinds that have six angles and only three cells. The leaves of these plants are long and narrow, resembling those of grass, and mostly proceed from the root. There is an affinity between these plants and the liliaceous tribe, notwithstanding they are distinguished by some particulars that place them in different classes.

The flowers of the next class, Tetandria, are characterised by having four stamens ; so are those of the fourteenth : but it is necessary to remark, that those under present observation are all of the same length, whilst those of the fourteenth are known by their inequality, two of them being long and two of them short, which is a distinction that must never be forgotten. The first order is thrown into five divisions ; some of the flowers of which it is composed are called aggregate. At the first view you might be ready to decide that they were compound flowers ; but, upon a more accurate inspection, you will find, that besides the florets growing on one common base or receptacle, inclosed by a ge-

neral cup or empalement, that each little floret has a separate cup peculiar to itself; thus we may consider them, with more propriety, as a head of distinct flowers, growing together, than as one compound flower composed of many parts. Let us take the Teasel* for an example. The common cup, containing the whole, consists of many leaves, which are flexible, and longer than the florets themselves; the receptacle is of a conical form. The proper cup, belonging to each floret, is so small as to be scarcely perceptible; those of the Scabious†, another genus of this order, are double. Each individual flower is formed of one tubular-shaped petal, and they are separated from each other by chaffy leaves growing between them. In the second division you will meet with the plantains‡, of which there are several species; it is a plant familiarly known to you, as you frequently gather it for your favourite Goldfinch; but as it is not very beautiful, perhaps you never examined it minutely. Gather a head or spike of it, and you will perceive that it is composed of many small flowers, which you must consider one at a time, to become acquainted with the parts of the fructification. Each of them has the calyx and the corolla divided into four segments, and the border of the latter turned back, as if broken; the filaments are very

* *Dipsacus*.† *Scabiosa*.‡ *Plantago*.

long;

long, and the seed-vessel egg-shaped, with two cells. In the grass-leaved Plantain, the stamens and pointals are in separate flowers. The fourth division contains a natural order, called the Starry Plants, which nearly agree in the following character : they have a small cup, divided into four sharp segments, above the seed vessel. The blossom is monopetalous and tubular, with an expanding border with four divisions. The stamens are four, with simple tips; the seed-bud double, containing two globular seeds; the stigma cloven or divided; and the stems four cornered, surrounded by the leaves in the form of a star. Madder*, Goosegrass† Woodroof, and Redwort are of this family. This class contains some of our most beautiful exotics, as Banksia, Protea, Embothrium, &c. There is a very singular plant belonging to the second order, which I cannot pass by without mentioning its peculiar properties. It is called Dodder‡, and is one of that kind that Linnæus has named parasitical, from the habit of clinging and supporting themselves by any other plant that grows near them. Hops, Flax, and Nettles are its favourites. It decays at the root, and receives its future nourishment from the plant to which it adheres; as soon as the young shoots have twisted themselves round the branches of a neighbouring

* Rubia.

† Galium.

‡ Cuscuta.

plant, they insert a kind of gland into the pores of its bark, and by this means extract its juices; and thus, in return for the support and assistance they receive, they destroy their benefactor: an instance, that lessons of morality may be learned from the vegetable as well as the animal kingdom. Those that entertain flatterers in either are generally repaid with ingratitude. With full assurance that our affection is mutual, and our gratitude reciprocal, I subscribe myself entirely yours,

FELICIA.

LETTER

LETTER XI.

Slrubby, May 20.

SO numerous are the objects that the class Pentandria presents, that I feel myself at a loss how to select a few of them for your observation. Happily for me, there are several natural orders in this class, which, by grouping many of them together, will enable me to perform my task more easily. The first division of the first order includes a family of plants, called by botanists *Asperifolia*, whose leaves are rough and hairy, and without leaf-stalks. Besides this peculiarity, they agree in having a cup of one leaf, with five clefts or divisions; a blossom of a tubular shape, also monopetalous; and the same number of segments: the five stamens are fixed to the tube of the blossom, and they have four naked seeds inclosed by the cup. Lungwort* is of this order: one species of it has a rough stem as well as leaves; the tube is white, but the border of the blossom is purple when it first opens, but afterwards becomes blue. You have probably admired the flowers of the Borraget†, when used for the cool tankard in summer, without remarking that the blossom is

* *Pulmonaria*.† *Borago*.

wheel-shaped, and the mouth crowned with five small protuberances: the fine blue colour of the petals, contrasted with the black lips, render it extremely pleasing to the eye. Mouse Ear, or Scorpion Grass, is common in dry pastures, and by the sides of rivers. In some species of it the seeds are covered with hooked prickles, which, by adhering to whatever touches them, is a curious method of conveying them from place to place. The beauty of the blossom of this minute flower repays the pains of examining it closely; it is of a celestial blue, adorned with a yellow eye. Houndstongue* is distinguished by each seed being inclosed in four seed-coats, fixed to the shaft of the pointal; it has a strong smell, like that of mice, and grows by hedges and pathways. The natural order, called Precia, is included in the second division of the first order of this class, and receives its name on account of the early appearance of the plants that compose it. The Primrose†, Oxlip, and Cowslip, the ornament of our meadows in the early part of spring, belong to it. The Polyanthus, so much admired and cultivated by florists for its variety and beauty, is derived from this stock; a pleasing instance of the improvement that art is capable of bestowing on nature; and resembling, in some degree, the difference

* Cynoglossum.

† Primula.

between

between the untutored mind and that of a person of education. The calyx of these flowers is of one leaf, tubular, sharp, and upright; the blossom also tubular, and of one petal, with the border divided into five segments; the seed-vessel is a capsule, superior, or inclosed within the calyx, containing only one cell; the stigma is globose. The species is marked by a five-angled calyx, the wrinkled surface and indented edges of its leaves. The Primrose has but one flower upon a fruit-stalk; the Oxlip and Cowslip several. I need not tell you that the blossoms of all these are generally of a pale yellow. The same division, of the first order of this class, contains a tribe of plants, called *Luridæ*, a name expressive of their noxious appearance and strong scent; marks kindly impressed by nature, to warn the incautious against their baneful effects, most of them being poisonous in a wild state. But change of soil and cultivation have rendered even some of these eatable: others yield to the skill of the physician, and, under proper management, are useful in medicine. Besides the characteristic marks of five stamens and one pointal, they coincide in a calyx that is permanent, and divided, like the corolla, which consists of one petal, into five segments. Their seed-vessel has two divisions, and is either

ther a capsule or a berry, inclosed within the flower.

A few individuals of this noxious family will suffice to guard you against approaching the rest too familiarly. The Thornapple* has an oblong cup of one leaf, divided into five angles and five teeth, which, though it falls off when the seeds ripen, leaves part of the base behind. The corolla is funnel-shaped, spreading wide from a long tube into a border, with five angles and five plaits; in one of the varieties the blossom is white, and, at night, the leaves rise up and inclose the flower. The capsule is large and covered with thorns; it has four divisions, and grows upright upon the remains of the cup; the seeds it contains are numerous and kidney-shaped. The smell of the Henbane†, though very disagreeable, has not always been sufficient to deter ignorant persons from suffering the fatal consequences of its poisonous qualities. Madness, convulsions, and death, have been produced by it. The common sort is distinguished by its indented leaves embracing the stem, on which the flowers sit close. It has a funnel-shaped blossom, with five blunt segments, one broader than the rest. The whole is hairy, and covered with foetid clammy juice, designed, perhaps, to drive away insects, which would other-

* *Datura*.

† *Hyoscyamus*.

wise be injurious to it. The Nightshade* is a principal genus in this forbidding order. The wheel-shaped corolla, short tube, and large border, stamens having oblong lips, approaching so nearly as to appear like one object, in the middle of the blossom, with the round glossy berry of this tribe, readily distinguish the plants that belong to it. Prickly stalks characterise some of the species, but others are void of these defensive weapons. The berry of the woody Nightshade is red, and its blue blossoms sometimes change to flesh-colour or white, whilst the garden Nightshade is known by its black berries and white blossoms. The Dwale, or deadly Nightshade†, is the most fatal in its effects. The leaves are egg-shaped and undivided, the blossoms a dingy purple. Woods, hedges, and gloomy lanes mostly conceal this dangerous plant; though it too frequently lurks near the husbandman's cottage, whose children are endangered by the tempting appearance of its bright shining black berries. The class Pentandria comprises so many orders, most of which contain genera worthy your attention, that it will supply matter for several letters. The present one being already of sufficient length, I will close it, with the account of the *Luridæ*, from

* *Solanum*.† *Atropa*.

whose

whose poisonous influence, I hope you will always be preserved.

FELICIA.

LETTER XII.

DEAR CONSTANCE,

Strubbery, May 10.

AS I told you, at the conclusion of my last letter, that we had by no means exhausted the stores of the fifth class, I shall proceed to give you an account of another family of plants, contained in the first numerous order. A permanent calyx with five divisions, a bell-shaped corolla of one petal, and a capsule for a seed-vessel, are the marks by which the natural order Campanacei, or Bell-flowers, is known. The elegant genus, *Convolvulus*, belongs to it, which receives its name from its propensity to entwine itself around any thing near which it grows; though there are some species of it that do not possess this quality. You will easily distinguish the flowers of this kind from all others, by their large, expanding, plaited corolla, slightly indented

ed at the edge with five or ten notches, the pointal terminating in two oblong summits, and the capsule, containing two roundish seeds, inclosed by the cup. The small Bindweed* is common in corn fields, the leaves are arrow-shaped, sharp at each angle; the flowers grow single upon a fruit-stalk; the colour of the blossom varies, it is sometimes reddish, or white, or striped, or purple. This humble trailing plant, though troublesome to the farmer, possesses more beauty than many that are cultivated for their rarity. The great Bindweed, another species of the same genus, with pure white blossoms, so often seen in fantastic wreaths, entwined on hedges or bushes, is another species. The leaves of this plant are also arrow-shaped, but the angles at the base appear as if they had been cut off, the fruit-stalk is four-cornered, and supports a single flower; close to the cup are two heart-shaped floral leaves, which seem to inclose it. The Bell flowers have a honey-cup in the bottom of the blossoms, which is closed at the base with five sharp valves, approaching and covering the receptacle; from these valves arise the stamens; the stigma has three divisions, which are turned backwards. The seed-vessel is a capsule, below the flower, with three or five cells; at the top of each is a hole, for the purpose of letting out the

* *Convolvulus.*

seeds as soon as they are ripe. What curious provision is made, not only to preserve the seeds of plants, but also to distribute them, that the species may not become extinct from negligence or inattention. The seed-vessels of the Giant Throatwort*, after the flowers are faded, turn downwards till they discharge their contents and then rise up again. This plant is known by its strong, round, single stalks; its leaves between egg and spear-shaped, their edges toothed; the flowers are solitary, growing on nodding foot stalks, towards the upper part of the stalk. The whole plant abounds with a milky liquor. Our favourite shrub, the Honeysuckle†, is included in the same order of the fifth class that has engaged so much of our time. You are well acquainted with its beauty and fragrance, but probably have never minutely examined its parts. The corolla is monopetalous and irregular; the tube long; five segments divide the border, which are rolled backwards, and one of them is scalloped deeper than the other. The seed-vessel is a berry with two cells, placed beneath the flower, and crowned with the cup. Several other well-known shrubs rank in the same order, some armed with thorns or prickles, and others defenceless; amongst the former is the Buckthorn‡, from which sap-green is made, by

* Campanula.

† Lonicera.

‡ Rhamnus.

mixing

mixing alum with the juice of its ripe berries.

The flowers are always incomplete; some plants producing only those that have stamens, others bearing those with a pistil alone.

Every part of this shrub contains the property of staining or colouring. In one species the bark is yellow, the outer sea-green, and the inner as red as blood: it is used by dyers. I dismiss the shrubs of this order, except the Currant*, the fruit of which is refreshing and agreeable, whether eaten fresh from the tree, or preserved with sugar. It is found wild in many parts of England. The Periwinkle† will supply me with an example of one more natural order, named *Convolvutæ*, because the divisions of the corolla are turned to the same direction with the apparent motion of the sun. There are several varieties of it, chiefly distinguished by the different colours of the corolla, which is salver-shaped; the segments connected with the top of the tube, which forms a figure of five sides. The general characters of this order are a cup of one leaf, divided into five segments; a corolla of one petal, frequently funnel-shaped, and furnished with a remarkable nectary; and a fruit, consisting of two vessels, filled with many seeds. I shall now proceed to the second order of the fifth class,

* Ribes.

† Vinca.

which

seeds as soon as they are ripe. What curious provision is made, not only to preserve the seeds of plants, but also to distribute them, that the species may not become extinct from negligence or inattention. The seed-vessels of the Giant Throatwort*, after the flowers are faded, turn downwards till they discharge their contents, and then rise up again. This plant is known by its strong, round, single stalks; its leaves between egg and spear-shaped, their edges toothed; the flowers are solitary, growing on nodding foot-stalks, towards the upper part of the stalk. The whole plant abounds with a milky liquor. Our favourite shrub, the Honeysuckle†, is included in the same order of the fifth class that has engaged so much of our time. You are well acquainted with its beauty and fragrance, but probably have never minutely examined its parts. The corolla is monopetalous and irregular; the tube long; five segments divide the border, which are rolled backwards, and one of them is scalloped deeper than the other. The seed-vessel is a berry with two cells, placed beneath the flower, and crowned with the cup. Several other well-known shrubs rank in the same order, some armed with thorns or prickles, and others defenceless; amongst the former is the Buckthorn‡, from which sap-green is made, by

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mixing

mixing alum with the juice of its ripe berries. The flowers are always incomplete; some plants producing only those that have stamens, others bearing those with a pointal alone.

Every part of this shrub contains the property of staining or colouring. In one species the inner bark is yellow, the outer sea-green, and the middle bark as red as blood: it is used by the dyers. Before I dismiss the shrubs of this order, I must notice the Currant*, the fruit of which is so refreshing and agreeable, whether eaten fresh from the tree, or preserved with sugar. It is found wild in many parts of England. The Periwinkle† will supply me with an example of one more natural order, named Contorta, because the divisions of the corolla are turned to the same direction with the apparent motion of the sun. There are several varieties of it, chiefly distinguished by the different colours of the corolla, which is salver-shaped; the segments connected with the top of the tube, which forms a figure of five sides. The general characters of this order are a cup of one leaf, divided into five segments; a corolla of one petal, frequently funnel-shaped, and furnished with a remarkable nectary; and a fruit, consisting of two vessels, filled with many seeds. I shall now proceed to the second order of the fifth class,

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† Vinca.

which

which contains a numerous family, in its third division, of umbelliferous plants; or plants, the flowers of which are disposed in rundles: but as the description of them will much exceed the limits of this letter, I shall defer them till my next, and point out a few examples of a different appearance, that belong to this order. The Grosefoots* are a tribe that will not invite notice by their beauty, being generally destitute of blossom; they are known by a five-leafed, five-angled, permanent calyx, inclosing one single, round, compressed seed; when that is ripe the calyx falls off, being no longer necessary. One species, called Allgood, is sometimes substituted for Spinach. The same class and order includes also the Gentians†, which are distinguished from their companions, by an oblong tapering capsule, slightly cloven at the end; it has one cell and two valves, to each of which adheres a receptacle growing lengthwise. The flowers vary in different species, but the figure of the fruit is uniform, therefore a proper characteristic for the botanist, whose skill consists in discovering those parts which are constantly alike, in all the species of the same genus. Linnæus was the first who perceived the advantage of finding invariable marks for classing and arranging the innumerable productions of

* Chenopodium.

† Gentiana.

the vegetable kingdom. Perhaps you will be surprised to hear that the stately Elm* ranks with plants of such inferior size and appearance; but you must remember, that it is not the outward form, but the similarity of the parts that are invariable, that unites different plants in the same class. Few persons, but those of nice observation, know that this tree bears any flower, because it is small, and appears in a season when the fire-side is more inviting to the indolent than the wholesome walk. The flowers precede the leaves, and soon fall off; the calyx has five clefts, and is coloured on the inside; it has no corolla, but the seed vessel is an oval berry, without pulp, containing only one seed, rather globular and a little compressed. The bark of the trunk is crooked and wrinkled, and is used as a medicine in several disorders. The evening is beautiful, and I am summoned by Mrs. Snelgrove to attend her in the garden. Love me as well as when we were together, and believe that my attachment is undiminished.

FELICIA,

* Ulmus.

LETTER

LETTER XIII.

Shrubbery, May 19.

THE umbellate plants, my dear sister, are so termed from their particular manner of growth, which differs materially from most others. From a straight stem, generally hollow and pithy, furnished with alternate leaves, proceed smaller stems, forming a sharp angle at their base, and diverging, or spreading like rays from a centre, in form of the ribs of an umbrella, which gives them the name of umbellate; each of the stems which form these rundles or umbels, as they are called, are frequently crowned with a roundlet, or smaller set of rays, terminated by the flowers, the parts of which I shall describe more minutely hereafter; as their distinctions are the principal thing to be observed, in determining to which class or order they belong. The base of each circle of stems is sometimes surrounded with small leaves called an involucre or fence, which is termed general when it incloses the whole rundle; and partial, if found at the base of the rundlet: many kinds have no fence. These differences throw the tribe into three divisions: the first including the plants with general fences,

ences, the next those with partial ones, and the last those destitute of any. The properties of this tribe are affected by soil and situation; those in dry places are aromatic and beneficial to the stomach, but the produce of watery ones are frequently poisonous. Various parts of many individuals of this race, supply our tables with a pleasing change of vegetables. We eat the roots of Carrots and Parsneps; the stalks of Celery and Finochia enrich our salads; the stems of Angelica, preserved, make a good sweetmeat; the leaves of Parsley and Fennel add a fine flavour to forcemeats and broths, and those of Samphire are used as a pickle; whilst the seeds of the Coriander and Caraway not only assist digestion, but, being encrusted with sugar by the confectioner, are eaten in the form of sugar-plums. When you are acquainted with a few of these plants, you will probably think their character and appearance so peculiar, that you shall not be liable to confound them with others of a different order; but, my dear Constance, to secure yourself from such a mistake, it will be always necessary to examine the contents of the flower carefully, as the only sure test to be relied upon. As there are plants of a different construction, that resemble these in appearance, at least to the eye of a superficial observer, without possessing the essential requisites of the umbellate tribe; they consist of a
cup

cup scarcely discernible; a corolla that grows upon the seed-bud, formed of five petals, which are generally heart-shaped and bent inwards; five stamens, and two pointals, upon a naked fruit, composed of two seeds growing together. The blossom of the Elder resembles them greatly at first sight, but, on further examination, you will be convinced that it has no claim to be ranged among them. After this general account of the umbellate tribe, you must be contented with a few remarks only, concerning some of the plants that compose it, as I am desirous of exciting your particular attention to the distinctions of the various species, which you would bestow on the real individuals, trusting to no written descriptions, as many of them have a strong likeness, as to external appearance, to those which possess very opposite qualities. Parsley and Fool's Parsley, Garden-Chervil and Hemlock-Chervil, Creeping Water-Parsnep and Water-Cress, have been often mistaken for each other, and the error has produced very disagreeable effects. The best season for acquiring a knowledge of their differences is when they are in flower, as the plants are then in the fullest perfection. The Fool's-Parsley is known from the True by a fence of three long, narrow, sharp-pointed leaflets, hanging down under every partial umbel: whereas the fence in the Garden-Parsley

Parsley is found at the base of the general, as well as the partial umbel, and consists only of a few short folioles, almost as fine as hairs. The rank, disagreeable smell of the Fool's Parsley, when the stem or leaves is bruised, is another guide to direct you in knowing it from the True, which at first sight it so much resembles. Hemlock Chervil * is a wild plant, which, notwithstanding it grows in dry situations, such as banks and the sides of high roads, is of a poisonous nature, and it not only belongs to the same division, but is of the same genus as the Garden Chervil; it is, therefore, very liable to be mistaken for it. The corolla in both is radiate, and the petals notched at the end; the middle flowers are frequently incomplete, and consequently produce no seed; the fruits are of an oblong shape. So far they coincide: but the Garden Chervil has the advantage in height, is of a pleasing aspect, and is adorned with light-green leaves; whilst its resemblance grows lower, and has hairy leaves of a darker colour. As I have told you that the Creeping Water-Parsnep † has sometimes been eaten instead of the Water-Cress, of which you are so fond, I will acquaint you with their most obvious distinctions, lest you should be deprived of the pleasure of your breakfast, from an apprehension of being poison-

* Scandix.

† Sium.

ed. They cannot be confounded when in blossom, the Water-Cress belonging to the cruciform tribe; but as that is not the time for gathering this plant, we must look for the difference in their foliage. The winged leaf of the Water-Parsnep is formed of leaflets longer and narrower than those of the Water-Cress, with edges like the teeth of a saw, and terminating in a sharp point: but if you remark the leaves of the latter, you will find that they have a brownish tinge; that the leaflets are of a roundish shape, and particularly the one at the end of the winged leaf; and that the edges are smooth, except a few indentures or curvings. Leaving the umbellate kinds to your future inspection, I shall proceed to notice several trees and shrubs which belong to the third order of the fifth class. The blossom of the Meal* Tree has a very small cup, superior to the seed-vessel, with five teeth; one bell-shaped petal, with five hollow clefts turned back; its fruit a roundish berry of one cell, concealing a single seed as hard as bone. The Guelder Rose, so ornamental to shrubberies, with its snow-white flowers growing in balls, is a variety of the Meal Tree. The Elder†, which I have warned you to distinguish from the plants of the umbellate tribe, is of this order; its beautiful blossoms, nodding like feathers, will afford you

* Viburnum.

† Sambucus.

a speci-

a specimen of flowers growing in a cyme. There is a kind of Elder with variegated leaves, which have a pretty effect amongst other Shrubs. Many parts of the Elder are useful: wine is made both from the flowers and the berries, and the root is applied as a medicine. The fourth order contains but two genera, of which the Parnassus* is one. This grows wild, but not very commonly, in marshy places; the leaves that are near the root are heart-shaped on long stalks; the stem-leaves sitting close to the stem. The seed-bud is open at the top, whilst the plant is in flower; being destitute of either shaft or summit, the stamens turn their lips towards the hole, and scatter the dust of their anthers into it, which renders the seeds fertile, and then return to their former situation. The petals are white, streaked with yellow; and the honey-cups are remarkable for their beauty as well as singularity. There are five of them, each hollow and shaped like a heart, surrounded with thirteen little shafts or pillars, set along the edge, and each crowned with a little globe. Thrift†, that pretty pink flower which edges the borders in the kitchen-garden, is of the fifth order, having five shafts with sharp summits, and five awl-shaped stamens fixed to the claws of the petals: there are twenty-two species, in which the cup varies as to shape,

* Parnassia.

† Statice.

but it is always of one leaf, dry and shrivelled like chaff: its corolla is of five petals, narrow at the base, but expanded toward the top; and the flowers growing in a round head upon a single stalk. Before I dismiss this numerous class, I must present you with a plant celebrated for its extensive utility. Flax * is of Egyptian origin, but has long been naturalized in this part of the world. This simple vegetable, of no greater height than twenty inches, is the chief material of the linen manufacture; the fibres of the stem, after undergoing various operations, being spun into thread, which is afterwards woven into cloth of different qualities: this substance, when worn out, is converted into paper, by means of mills, which grind the rags to a pulp. The seeds supply birds with food, and yield an oil by pressure only, that is excellent in disorders of the lungs: painters and varnishers are indebted to the oil obtained from Flax Seed; and the cakes, made of the husks after the oil is squeezed out, are extensively useful to fatten cattle: the very dust is of value, being found an excellent manure. Were I to enumerate all the purposes to which this plant is applied, it would fill a volume, rather than a letter, and lead me far away from the object before us, which reminds me to inform you that Flax has a five leaved calyx, and a

* Linum.

corolla

a corolla of five petals; the capsule opens by five valves, being divided in the inside into ten cells, each containing one seed. The blossoms are blue, which are produced on an unbranched stalk, with alternate lance-shaped leaves. Having selected a sufficient number of specimens of the class Pentandria, I shall close my letter, believing that the objects already described will furnish you with sufficient employment, till I have leisure to collect farther information, relative to those that are to follow. This fine season should encourage you to spend a great deal of time abroad. Remember to use your eyes, and let none of Flora's beauties escape your observation. Adieu.

FELICIA.

LETTER XIV.

DEAR CONSTANCE,

Shrubbery, June 1.

THE class Hexandria, or flowers with six stamens, includes the far greater part of the liliaceous tribe; but do not suppose that it consists of them alone; other plants are to be found in it,

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though

though comparatively few in number. Our gardens receive many of their most splendid embellishments from the flowers of this description. The gaudy Tulip, with its striped coral of varied hues, produced by the art of the florist from a single colour in its natural state, has been so highly rated for its beauties by Dutch connoisseurs, as to be sold for one hundred ducats the single root. The Hyacinth, of different colours and delightful fragrance; the whole family of Lilies; the magnificent Amaryllis; the great American Aloe, that rises to the height of twenty feet; with all the lesser plants of that denomination, rank among those of the liliaceous kind; with many more, remarkable for the delicacy of their form and the splendour of their colours: but as most of these are of foreign extraction, I shall pass them over as objects of admiration only, and search among the humble plants of our own growth, for a few worthy of minute description. Some of this family have a calyx, others are entirely without, and the buds of many of them are inclosed in a sheath or husk, which bursts as the coral expands: this circumstance throws them naturally into three subdivisions. Among the plants of the latter is the elegant Snowdrop*, so much valued by those who delight in the return of spring, as one of its

* *Galanthus*.

earliest harbingers. Its corolla is superior, and consists of six white petals, a little tinged with green, of which the three innermost are the shortest, and are supposed to be the nectary. This beautiful little flower never appears to more advantage than when it intermixes its blossoms with those of the Golden Crocus, which is nearly related to the same tribe, by its manner of growth and external structure; the calyx is a sheath, and the corolla has six divisions, the tube descending towards the root; but it is separated from it, by the artificial system, as it has only three stamens and one pointal. Meadow Saffron*, which is very like the Crocus, however belongs to it, and is included in the third order of this class. It is found in the month of September in pastures, with flat spear-shaped leaves, and pale purple blossoms, which are doubled by cultivation, and changed into various colours. But to return to the first order, from whence I have wandered a little for the sake of uniting the Crocus with the Snowdrop. The Daffodil and the Narcissus have only one flower, produced from the same sheath: their general character consists of six petals, forming a superior corolla; a funnel-shaped honey-cup of one leaf, containing the stamens, which are fixed to its tube. The Hyacinths, cultivated with so

* Colchicum.

much care, are frequently double, and the blossoms are of various colours; but whatever pleasure they yield us, as objects of sight and smell, we must reject them for the wild Harebell, in which we shall be able to trace their original features, unimproved by the polishing hand of art. The Hyacinth in its native state has no empalement; its blossom is bell-shaped, and of one petal, the border divided into six clefts, and turned back: at the point of the seed-bud are three pores filled with honey. The modest Lily of the Valley* differs from the Harebell in its seed-vessel, which is a round berry, spotted before it is ripe, whilst that of the Harebell is a capsule. Solomon's Seal is distinguished from the Lily of the Valley, by its stem being clothed with alternate leaves, whereas the Harebell has a naked stalk. The Barberry is a shrub that belongs to this first order of the sixth class; though it has no pretensions to range with the liliaceous tribe, its leaves change into thorns. A fine sweetmeat is made of its berries. The ears of corn that grow in its neighbourhood never fill: its baneful influence in this respect extends some hundred yards. The stamina are extremely irritable; if the threads are touched ever so slightly, the tips approach the pointal, and scatter the pollen with expansive force. All the species of

* *Convallaria*.

Rush, and some others, which are deficient in the corolla, belong to the same order. Rice belongs to the second order of this class, and is chiefly produced in the East and West Indies. The Docks* are a numerous genus, belonging to the third order; their beauty is not attractive; they are known by a cup of three leaves, a corolla of three petals, not unlike the cup, but larger: they have no seed-vessel, but the petals, bending in a three-cornered form, inclose the seed, which is triangular. The fifth order contains the Water Plantains†, which are distinguished by a cup of three leaves; a corolla of three large, flat, circular petals, greatly expanded; succeeded by more than five capsules, each concealing one seed. They are found in ditches and other shallow waters. The seventh is the smallest of all the classes: I shall present you with but one specimen of it. The cup of the Winter Green, or Chickweed, has seven spear-shaped leaves; the blossom is formed like a star, and, though divided into seven segments, is of one petal. It has a globular seed-vessel, which is a berry not unlike a capsule, of one cell, with a very thin coat, opening by several seams. Although seven is the general number found on this plant, it sometimes deviates from it. In one species of it, the parts of the fructification are

* Rumex.

† Alisma.

defended against the injuries of rain, by the closing of the petals, and hanging down of the flowers at its approach. In this class the genus *Saptas* is remarkable for having seven divisions in the calyx, seven petals, seven stamens, seven pointals, and seven capsules. In the eighth class are found the Willowherbs*, generally characterised by a superior cup of four tapering coloured leaves; a corolla of four circular expanding petals; the summit of the pointal divided into four clefts; a very long capsule of four cells, containing numerous seeds crowned with a feather, doubtless to waft them to a distance, when mature. In some species the stamens and pointals are upright, but lean towards the lower side of the blossom in others. The shape of the leaves is another distinction that marks the different species, as well as their manner of growth; the small-flowered hairy Willowherb has spear-shaped, woolly, toothed leaves, growing opposite to one another. The great flowered Willowherb, (vulgarly called Codlings and Cream,) has its leaves running along, and embracing the stem; the top shoots have a very delicate smell, but it is lost almost as soon as they are gathered. These plants are generally found in marshy places, or on the banks of rivers. Heaths and commons, especially in the northern counties of

* *Epilobium*.

England,

England, produce the Whortle*. The moor-game live upon the berries in autumn; some kinds of them are also eaten freely by the common people; they make pleasant tarts or jelly, and are flavoured much like the American Cranberry. They are generally known by a very small cup, a blossom of one petal, bell-shaped, with four clefts rolled backwards. The seed-vessel is a roundish berry with a hollow dimple, divided into four cells, in which are found a few small seeds. Some species are evergreen; others lose their leaves at the approach of winter, which naturally throws them into two divisions. The Black-worts, or Wind-berry, and the Great Bilberry Bush belong to the latter: their fruit-stalks support a single flower; but the leaves of the Black-worts are toothed like a saw, and the blossom divided into five clefts, whilst the Great Bilberry Bush has oval leaves with smooth edges. Numerous species are contained in the Heath† genus; the beauty of the foreign sorts has introduced them into our greenhouses, where they do not shrink from a comparison with the brilliant productions of distant countries collected together. Many of our own would be valued as beautiful, were they less common; but such is our perverseness, that whatever is difficult to be obtained, we esteem in proportion to that diffi-

* *Vaccinium*.† *Erica*.

culty. They mostly agree in these characters— a calyx of four leaves, upright, coloured, inclosing the germ; a blossom of one petal, cut into four segments, the figure of which varies between egg-shaped and oblong; the threads of the stamens standing on the receptacle; tips cloven at the point, and a capsule of four cells. The stamens in some species are longer, and in others shorter than the blossom. Common Heath has the tips inclosed within the blossom, which is bell-shaped; its leaves are opposite and arrow-shaped. In our happy climate, this plant is but little regarded, except for its honey, with which it supplies the bees in abundance. It is only used for inferior purposes, such as making besoms and firing for ovens; but in the barren Highlands of Scotland it is of extensive use; the poor cottagers make the walls of their wretched cabins of alternate layers of Heath, and a kind of mortar made of black earth mixed with straw, and the roofs are thatched with it. So destitute of domestic comforts are these poor people, that they are contented with beds formed of the same material: they contrive to make them soft enough to sleep upon, by placing the roots downwards, and the tops only appearing at the surface. Mrs. Snelgrove tells me, that as we advance in the science of botany, we must not confine our information to the form of plants,

or

or the number of their parts, but should extend our researches to the purposes to which they are applied; a study that will supply us with much useful knowledge and entertainment at the same time. The stalks of the cross-leaved Heath are shrubby, and rise from nine to twelve inches high; the leaves are fringed with hairs, and grow in fours, like a cross, pressed close to the stalk; each of the hairs at the edge of the leaves appears, in a magnifying glass, to terminate in a small, round globule. The corolla is nearly oval, of a pale red colour, forming a little head, one flower hanging down over another. The tips are inclosed in the blossom. The Mezereon* is included in the same order with those already mentioned, in the class Octandria, the early blossoms of which adorn our shrubberies in February. It has no cup, but a funnel-shaped corolla of one petal, inclosing the stamens, and the border cut into four segments. The fruit is a berry, in which is found a single seed. The sort commonly cultivated is distinguished by its flowers growing by threes, from the same joint, sitting upon the stem. The leaves are spear-shaped. The buds at the ends of the stalks produce leaves; those on the sides, flowers; which are so thick set as to make the branches appear of a beautiful rose colour.

* *Daphne*.

There

There is another species that bears yellowish green blossoms, and is valued as an evergreen. The third order contains a numerous genus, among the species of which is the family of Snakeweeds*. They concur in having a turban-shaped cup, coloured within, and divided into five segments, which, if you please, you may term the corolla, and then the cup will be wanting. The flowers of the greater Bistort grow in a spike on an undivided stem. The lower leaves are somewhat heart-shaped, and continued down the stalk. The root is one of the most powerful vegetable astringents. Knot-Grass is found commonly by road sides and corn fields. It has a trailing stem, and the flowers are produced at the base of the leaves, which vary much in form, but are generally inclined to spear-shaped. The seeds supply food to great numbers of small birds. If my letters are too long, tell me so, and I will correct my prolixity, or at least endeavour to restrain it within moderate bounds. But when I am writing to my dear Constance, the time is insensibly beguiled, and I forget the necessity of concluding. Most tenderly your

FELICIA.

* Polygonum.

LETTER

LETTER XV.

DEAR CONSTANCE,

Shrubbery, June 6.

THE pleasure I feel in writing to you is the cause that I never want leisure for this agreeable employment; if my tasks do not afford me time, I can readily steal an hour from those allotted to sleep or diversion. I am fully convinced that inclination is always wanting, when one friend cannot find opportunity to write to another. The Flowering Rush* is the only plant, found wild in England, that belongs to the class Enneandria. It grows in the water, and has a round, smooth stalk, which rises from one to six feet high, according to its situation; at the top of which is a head or umbel of bright red flowers, sometimes not less than thirty, surrounded at the bottom of the umbel by an involucre of withered sheaths; three short leaves form the cup; the corolla has six petals. It has six pointals, and six long tapering capsules of one valve, opening inwards, filled with numerous small seeds. This plant, so stately from its height and its beautiful tuft of flowers, would make a charming appearance in canals or other

* Butomus.

pieces

pieces of water, if introduced and cultured by art; and, as it is so hardy as to defy the cold of Lapland, there would be no reason to fear the utmost severity of frost. Many remarkable foreign plants belong to this class; it will be sufficient to enumerate a few of them. Bay, Cinnamon, Cassia, Camphor, and Sassafras, are comprehended under one genus, and are most of them useful for medicinal purposes. Rhubarb, so well known as a stomachic, is also of the same class, and is successfully cultivated in this country; but as its extraction is foreign, it does not come within my plan to give a further account of it. The tenth class will supply us with a greater variety. Linnæus has conveniently divided the first order into such as have corollas of many petals, those of one petal, and such as are without any. The first of these are again divided into such as have irregular, and those which have equal corollas. Birdsnest* has no empalement, unless you give that name to the five outermost coloured petals of the corolla, which are hunched at the base, and have a cavity for honey on the inside; it has five others, all of an oblong shape, upright, and nearly parallel. The seed-vessel is pentangular, and egg-shaped, with five valves containing many chaffy seeds. These are the characters by which the terminat-

* Monotropa,

ing flower is known; but it is worth your notice to remark, that if there be any lateral flowers, you must subtract one-fifth of every part of the fructification. This is the case, with many other plants, which makes it necessary to examine the central or principal flower. In some plants the side flowers have a fifth more of the parts than the primary one. The Strawberry Tree* is a beautiful shrub, bearing bunches of white flowers of the present year, whilst the red berries of the last season remain pendant upon it. It grows without culture in the west of Ireland, near the Lake of Killarney, on barren lime-stone rocks, and is esteemed a great ornament to the romantic views of that delightful situation. It is known by a very small cup, an egg-shaped corolla of one petal, with five small reflected segments; the seed-vessel is a roundish berry, with five cells, filled with small seeds as hard as bone. The stem is woody, and the leaves smooth, but toothed at the edges. In one species, the stems trail and the leaves are wrinkled, with black berries sitting upon a very small red cup. The second order presents us with the Saxifrages†, a numerous genus, of which the pyramidal saxifrage is one, which stood last summer on the hall chimney-piece, whose beautiful cone of white flowers remained some weeks in blossom. They

* *Arbutus*.† *Saxifraga*.

are distinguished by a calyx divided into five parts, a corolla of five expanding petals, narrow towards the base, a capsule of one cell, terminating with two beaks, or sharp points, in which are lodged many minute seeds. The white Saxifrage has a bearded root, composed of a number of little grains or bulbs, connected together in clusters by the fibres. The stem is hairy, a little branched, and grows about a foot high; the leaves next the root, placed on long foot-stalks, are kidney-shaped; the flowers terminate the stalk in small bunches, the corolla is white, streaked with yellowish veins. It thrives best in gravelly soils, flowers in May, and produces its seeds in the month following. The genus *Dianthus* includes the rich Carnation, with its spicy odour; the modest Sweet William; and the whole tribe of Pinks, in all their varieties. Charming as these objects are rendered in the garden, by their colours and fragrance, as on former occasions, we must have recourse to the fields, in search of some of the species that are to be found there, in a state of nature. They agree in having a cup formed like a cylinder, toothed at the mouth, and encompassed at the base with four scales. A corolla of five petals, with claws as long as the cup, fixed to the receptacle, and scalloped at the edges; a cylindric capsule of one cell, opening at the top in four

four directions. The principal thing to be observed in ascertaining the species of this beautiful genus, is the manner of flowering. The Sweet William has its flowers incorporated, or one head formed of many single flowers. Pinks have several flowers proceeding from the same stem, not in bunches, but solitary or separate. One species is known by a low herbaceous stem, supporting a single flower. The form of the scales is another circumstance, which distinguishes the species. In the Sweet William they are as long as the corolla, those of the Carnation and Pink are very short. The blossoms of the wild Childing Sweet William expand about eight in the morning, and close about one in the afternoon. What is the cause of this peculiarity? Many other plants shut up their blossoms at a particular hour; doubtless this instinct is bestowed upon them for some wise purpose of preservation, which is worthy the attention of botanists to discover. The Sandworts* and Stitchworts are found in the third order, and have a great similitude to each other. They both have a capsule with one cell; in the former the petals are of one piece, but in the latter they are divided almost to the base. The genera of Champion† and Catchfly‡ have also a near resemblance, the capsules of both being divided into

* Arenaria.

† Lychnis.

‡ Silene.

three cells, and their petals cloven; but the Catchflies are distinguished by the honey-cup, which is composed of two little teeth at the neck of each petal, forming a kind of crown at the mouth of the tube. All four have five petals in the corolla. Among the plants of the fourth order are found the Stonecrops*, so called from growing on walls, roofs of houses, or rocks, where there appears scarcely any mould to nourish them: one species, the Sedum Acre, will flourish when hung up by the root, a proof that it receives its principal sustenance from the air; which is the case with most of the succulent plants. They are generally known by a calyx cut into five segments, a corolla of five petals, five honey-cups, consisting of a small scale, placed at the base of each germen. Five capsules, with as many pointals, and twice the number of stamens, the characteristic marks of the class and order. The different species of Cuckoo-flower, or *Lychnis*, agree in having a tubular cup of one leaf, a corolla composed of five petals, frequently cloven, and a capsule with one cell and five valves. The names of Meadow Pink, Wild Williams, Ragged Robin, and Cuckoo-flowers, are applied to one species, which abounds in moist meadows, and is entitled, for its beauty, to a place in our gardens; the stems are trailing,

* Sedum.

but

but upright when in flower: the petals are of a fine red, and deeply jagged at the edges. The appearance of the blossoms about the time of the cuckoo's return, has probably given rise to its last name. In the Campion Cuckoo-flower the stamens grow upon one plant, and the pointals upon another. The Clammy Cuckoo-flower has undivided petals and capsules, with five cells. The Woodsorrel* is generally found in woods and moist shady lanes; and, contrary to expectation, the same plant thrives on mountains, which is accounted for, by an observation of Linnæus, that the clouds, resting upon the tops of mountains, produce the same state of atmosphere as fogs in low marshy situations. Breakfast bell rings, and I must obey its call. Farewell.

FELICIA

LETTER XVI.

DEAR CONSTANCE,

Shrubbery, June 10.

A NEW risen sun, shining into my chamber windows, has awakened me rather earlier than usual; but I do not repine at being disturbed, as

* Oxalis.

it affords me a convenient opportunity of renewing my subject. The eleventh class, Dodecandria, will present us with some difficulties, but they may be overcome by patient attention. The number of stamens is by no means certain: all plants, that have from twelve to nineteen inclusive, belong to it, provided they are fixed to the receptacle, which is an important circumstance to be observed, as the number of stamens cannot be relied upon. Some plants have less than twelve, and others more than nineteen. Loosetrife* has a cylindrical cup of one leaf, with twelve teeth, inclosing the germ; a corolla of six petals, fixed by the claws to the divisions of the cup; a capsule of two cells, in which are lodged many small seeds. Its purple spikes adorn the banks of rivers in July. There is a variety with a six-cornered stem, and the leaves growing three together; this species has twelve stamens, but in some others there are not so many. In the common Agrimony†, the number of stamens is equally uncertain: you may find twelve in some plants, sometimes ten, and frequently seven. It has a small calyx, cut into five segments, surrounded by another cup, a corolla of five petals, growing to the cup, and one or two roundish seeds in the bottom of the calyx; the stem leaves are winged, the odd one at the

* Lythrum.

† Agrimonia.

end

end supported upon a leaf-stalk. The seeds are covered with bristles; the yellow blossoms grow in spikes, and resemble an apricot in smell. The third order consists of two genera; Yellow-weed * and Spruget†, both very difficult to ascertain, on account of the irregularity of the parts, with respect to the figure and number. The essential character of the first is marked by the petals with three clefts, one of them containing the honey-cup in its base, and a capsule of one cell, always open; the cup is of one leaf, divided into segments, two of them more gaping than the rest, being distended by the honey-cup petals. Dyers Weed is found on barren ground, or on walls, and affords a most beautiful yellow dye for cotton, woollen, silk, or linen; the yellow hue of the paint called Dutch Pink is procured from the stems and roots of this plant, in which the quality of tinging resides. The ancient Britons are supposed to have stained their bodies with the juice of it. The cup is cut into four segments; the petals are three; the upper one, being the honey-cup, is divided nearly half way into six parts. The petals that grow on the sides, and opposite to each other, have only three segments; and sometimes two very small entire petals grow below them. The flowers blow in a nodding spike, which follows

* Reseda.

† Euphorbia.

the course of the sun, turning towards it, when it rises, and bending after it till it sinks beneath the western horizon. At night it points to the north. A cloudy sky has not influence to prevent the faithful attachment of this flower to the sun. Spurge has a cup of one leaf, cut into four (and in some five) segments, the corolla varies in like manner with respect to the number of its petals, which are in some four and in others five, hunched thick, irregularly situated, and fixed by their claws to the edge of the cup. The stamens are twelve or more, appearing at different periods. The seed-vessel is a capsule, that is either smooth, hairy, or warty, consisting of three cavities united, each containing one seed, and opening as with a spring even while they are green. The numerous species of this genus are conveniently divided into those that bear flowers in rundles, with three divisions; others that have rundles with five divisions; and those whose rundles have many divisions. Most of the Spurges are filled with a milky, gummy juice, which is very sharp and corrosive. There is a great resemblance between some of the plants of this natural family; two of them, that have a strong similitude to each other, are frequently cultivated in gardens; but a close examination will teach us to distinguish the one from the other. The leaves of the Sun Spurge, are
notched

notched or serrated at the edges; but in the small Garden Spurge they are entire. The petals, or nectaria, of the former, are round and even at the edges, whilst those of the latter are armed with two little horns. The rundles of the small Garden Spurge have three divisions, which are separate in pairs; those of the Sun Spurge have five divisions, with five leaves, which divide again into three clefts, with three leaves, and then fork into pairs. The same number prevails in every part of the blossom of the House-leek*; the divisions of the cup, the petals of the corolla, the stamens, seed-buds, and capsules, vary from six to twelve: this genus has a near affinity to the Stonecrop, but differs from that, in always having more than five petals. It generally grows on walls, or the roofs of houses. Feeling an inclination for exercise, I shall lay my pen aside till a future occasion. My warmest affections attend you, and those you are with.

FELICIA.

* *Sempervivum*.

F

LETTER

species concur, are a cup, divided into five parts, sitting on the top of the germ; a corolla composed of five petals; and a fleshy berry containing two seeds. The leaves of the White-bean Tree are egg-shaped and jagged; their under surfaces downy. The leaves of the White Thorn are blunt, with three indentures: it frequently deviates from the general character, by having only one pointal and one seed in each flower. The principal distinction, between the shrubs of the second and third orders, consists in the number of the pointals. The fourth order, known by its five pointals, comprehends three genera, the Wild Service Tree*, the Medlar†, Apple, (in which Pears are included,) and Meadow-sweet. Their common characters are, a five-toothed cup, and a corolla of five petals. Their distinctive marks consist in the diversity of their fruits: in the first it is a berry, in the second an apple, and in the third a set of capsules. The fifth order contains the elegant natural order of Rosaceæ, consisting of Black-thorn, Strawberry, Tormentil, Rose‡, &c. The different species of the queen of flowers, so aniversally admired, agree in a cup with five divisions; a corolla of five petals; and a turban-shaped fleshy berry, formed out of the cup, and terminated by the divisions of it, inclosing several oblong hairy seeds, adher-

* Sorbus.

† Mespilus.

‡ Rosa.

ing to the cup on all sides. Their distinctions chiefly consist in the form of the fruit, whether inclining to round or oval; the situation of the spines on the different parts of the shrub; and the manner of flowering. This general favourite has received all the advantages which art can bestow on it; the varieties are numerous, produced by cultivation: scarcely any garden is so mean as to be destitute of a Rose. The Strawberry*, of which so many kinds are produced by the skill of the gardener, has the cup divided into ten segments, but the number of the petals is only five: the seeds are scattered upon the surface of the receptacle, commonly called a berry. Having come to the conclusion of this class, I shall likewise close my letter; not that I have exhausted all the specimens it affords, but have described those that appear to me to have the best claim to your notice. Adieu!

FELICIA.

* *Fragaria*.

LETTER XVIII.

DEAR CONSTANCE,

Shrubbery, June 21.

FREQUENTLY am I tempted abroad, when indolence would keep me within doors, in search of specimens for my next letter; thus, many advantages result from the pursuit of one object. In the thirteenth class, Polyandria, the stamens are numerous, springing from the receptacle, along with the pointal; which is a material distinction from those that belong to the former class, which I have remarked to be always attached to the cup. The objects of our present consideration are, many of them, pleasing to the eye, but unlike those delicious and wholesome fruits, lately described, in their qualities, being poisonous to the human constitution. In the first order is found the Poppy*, which has a cup of two leaves, which falls off as the flower expands; a corolla of four petals; and a capsule of one cell, crowned with the summit, and opening beneath it with many holes: through these the numerous small seeds find a passage. The seed-vessel in some species is round, in others oblong; it is smooth in some kinds, and beset with strong hairs in others; the number of rays in the sum-

* Papaver.

mit is not always the same. Opium, so celebrated for its faculty in stilling the severest pain, is made from the milky juice of the White Poppy. The same order contains the Water Lily*, whose beautiful flowers adorn slow rivers and ponds in the months of July and August. The calyx is composed of four large leaves coloured on the upper surface; the petals of the corolla are numerous, frequently as many as fifteen; it has a large egg-shaped seed-bud; a circular flat summit, not supported by any shaft, but sitting, and marked with rays. There are two species, the flowers of the first grow on fruit-stalks, the blossoms are yellow. Those of the second open about seven in the morning, and close about four in the afternoon, and then lie on the surface of the water. The summits are numerous, and placed in a circle, corresponding in number with the cells of the seed-vessel. The corollas are a delicate white. As soon as these splendid water-flowers have perfected their fructification, by the absorption of the pollen by the pointal, their long stalks, which always grow in proportion to the depth of the water, in order to raise the corollas above it, refuse their support, and the flowers sink down many feet beneath the surface. There is a remarkable contrivance exhibited in the process of the fructification of the

* *Nymphaea*.

Vallisneria of Italy, also a water-plant worth mentioning. The stamens and pointals are disposed on different plants, whilst both are in blossom; the anthers fall off, and floating among the pistilliferous flowers, fertilize them with their pollen. This plant grows in the Rhone, and has the remarkable property of contracting, or lengthening out its flower-stalks, so that the flowers may always float on the surface of the water, which, in depth, is very variable. A cup of five leaves, two smaller than the rest; a corolla of five petals; and a capsule, covered by the cup; are the characteristics of the genus *Cistus*, to which many beautiful shrubs belong, though some of them are herbaceous. In different kinds, the corollas are either purple, white, or yellow. The *Lime** seldom brings more than one seed to perfection, and this pushes aside the others that are barren; so that a careless observer might suppose that the capsule had but one cell, whereas it has five. The *Larkspur*†, belonging to the third order; the *Columbine*‡, to the fifth; and the *Hellebore*§, to the last; with some others; unite in having several capsules joined together, no cup, a corolla of five petals, and a numerous set of stamens. The differences of their honey-cups, which are remarkable, serve to point out their generic distinctions: the *Larkspur* is known from its com-

* *Tilia*. † *Delphinium*. ‡ *Aquilegia*. § *Helleborus*.
panions,

panions, by three capsules, and a honey-cup that is cloven; the front standing in the midst of the petals, and turning backwards like a horn or spur. Columbine has five capsules of a cylindrical form, and five equal honey-cups, shaped like a cornucopia, situated alternately between the petals. Cultivation frequently increases the number of these nectaries, and diminishes that of the petals: when they grow wild, the blossoms are blue, but are found of various hues in gardens. Hellebore has several capsules, and many very short honey-cups, forming a circle round the outside of the stamens; their shape resembles a tube, with the mouth divided into two lips. The various-coloured Anemonies, that adorn the flower-beds early in spring, and are found commonly in woods in the month of April, are distinguished from the *Ranunculus*, by the want of an empalement, which, in the latter, consists of five leaves; but the essential character of this genus is marked by the honey-cup: in some species it is a naked pore; in others it is surrounded by a cylindrical border; and is sometimes closed by a scale indented at the end. There are three kinds of Butter-cups, which are species of the *Ranunculus*, which give a golden hue to our meadows by the brilliancy of their yellow blossoms; one of them has a bulb-

ous root, something like a turnip; the leaves of the cup bent backward; the fruit-stalks furrowed, each supporting a single flower. The second sort has an open cup, and throws out creeping suckers; the last grows taller than the other two, its cup is open, and the fruit-stalk round. The yellow colour of butter is attributed to the cows feeding on this plant; but, like many commonly received opinions, it is probably an error, as it is so acrimonious, that cattle seldom eat it, unless pressed by hunger. Although my letter is not so long as usual, I am inclined to close it with an account of the specimens of the class Polyandria, thinking I shall preserve a greater perspicuity, by confining the subject of one letter to the same class. With all sisterly affection, I am yours,

FELICIA.

LETTER XIX.

DEAR CONSTANCE,

Shrubbery, June 29.

THE essential character of the fourteenth class, Didynamia, consists in four stamens to each flower, one pair shorter than the other; the
shortest

shortest pair grow together, and adhere to the shaft of the pointal. The orders are not distinguished, as in the former classes, by the number of the pointals, because none of the flowers have more than one, which, with the stamens, is inclosed by an irregular corolla of one leaf. The manner in which the seeds are disposed, is the circumstance upon which the respective orders depend. The first, called *Gymnospermia*, has four naked seeds fixed to the bottom of the cup, without any seed-vessel. The other, (for there are but two,) denominated *Angrospermia*, has the seeds inclosed in a capsule. The first order contains those plants that grow in whorls; most of them have a square stalk, and their leaves are produced in pairs. The personate flowers are comprehended in the second; but its distinctive character rests upon the seeds being contained in a capsule. The construction of these flowers, in general, is curiously adapted to preserve the tips of the stamens from the injuries of the weather, as also to convey their dust to the summit of the pointal, which is necessary to render the seeds fertile. They grow nearly upright, but bend a little from the stem, by which attitude, the upper part of the corolla shelters the parts of the fructification. None of those parts are poisonous, but many of them are admired for their odoriferous smell and kitchen uses, as well

as for the medicinal qualities which some of them possess. A cup, divided into five clefts, is a circumstance in which the following plants of this order generally agree: Motherwort^a, Ground Ivy^b, Mint^c, Germander^d, Bugle^e, Betony^f, Dead Nettle^g, Catmint^h, Henbitⁱ, Horehound^k; but Thyme^l, Self-heal^m, Marjoramⁿ, Basil^o, Balm-leaf^p, and Calamint^q, have their calyxes cleft into two parts. Small swellings are frequently found upon the leaves of the Ground Ivy, which are occasioned by an insect; if opened they are observed to be composed of many cells. In Mint, the stamens are distant, upright, and one pair longer than the other; but those of the Water-Mint are all nearly of the same length. The upper lip of the blossom of the Germander is deeply divided, and the parts gaping widely asunder, gives it the appearance of wanting that part of the corolla. The flowers of one species of the Bugle grow in the form of a four-sided pyramid beset with hairs. Betony has the upper lip circular, entire, flat, and upright; the lower one divided into three segments; the middle ones notched at the end. Wood Betony has the

- | | | | |
|------------------------|---------------------------|------------------------|------------------------|
| ^a Leonurus. | ^b Glecoma. | ^c Mentha. | ^d Teucrium. |
| ^e Ajuga. | ^f Betonica. | ^g Lamium. | ^h Nepeta. |
| ⁱ Ballota. | ^k Marrubium. | ^l Thymus. | ^m Prunella. |
| ⁿ Origanum. | ^o Clinopodium. | ^p Melittis. | ^q Melissa. |

root-

root-leaves on leaf-stalks ; the others, heart-shaped and sitting close to the stem ; the flowers grow in an interrupted spike. The red Dead Nettle, though a weed regarded with contempt, is a pleasing ornament to the banks of ditches in the early part of summer. Its blossoms, of a reddish purple, grow in whorls, consisting of many flowers, on the tops of the stems, which being intersected with green leaves, gives it a pretty appearance. The construction of the cup in the Hooded Willowherb is deserving of peculiar remark : the rim is almost entire, covered by a scale lying over it like a lid ; when the blossom falls off, the cup closes upon the seeds, which would remain shut up without possibility of escape ; but the cup withers and divides into two separate parts, and by that means affords the seeds an opportunity of falling to the ground, and producing young plants the next season. Thyme is another of those which have the cup bilabiate, or cloven into two lips ; the stems of the Common Thyme are woody ; the Basil Thyme is distinguished by the middle segment of the lower lip of the corolla being notched, and marked with a raised white spot in the shape of a crescent. The generic character of Self-heal consists in its forked stamens, the tips fixed to the threads beneath the top, and adhering only to one of the divisions of the fork. In open, sunny

sunny situations, it trails; but grows upright, a foot high, in woods. Marjoram is known by a spiked fence. The flowers grow in roundish spikes; the leaves, oval and pointed, are produced on leaf stalks; the blossoms are purple. The whole plant is a warm aromatic; and is found among brambles and hedges in the month of July. Let us proceed to the second order, which you may recollect is distinguished from the first by the seeds of all the genera being inclosed in a pericarp or capsule. The plants of this order are not universally harmless, as in the last, but are frequently poisonous. The number of segments in the cup varies; in some it is divided into two parts, in others four, and in many five. It is remarkable that many of those whose calyx is divided into four segments turn black in drying. The corollas of the first order are almost all of them labiate or ringent, but in those of the order under notice many of them are personate, or have the lips closed. Broomrape* has a cup, with either two or five clefts; a gaping corolla, with four segments nearly equal; and a gland at the base of the seed-bud, for the purpose of secreting the honey. A downy, undivided stem, and the stamens appearing above the blossom, distinguish the common kind. Toothwort†, Paintedcup‡, Eyebright§, Rattle||,

* Orobanchæ. † Lathræa. ‡ Bartsia. § Euphrasia.

|| Rhinanthus.

and

and Cowwheat*, are among those whose cups are cloyen into four segments. The capsule of the first is roundish, but terminates in a small point: it has one cell and two elastic valves, surrounded with the cup, which is large and expanding. The Paintedcup is distinguished by its coloured cup from the Rattle, the Eyebright, and the Lousewort, between which it forms a sort of connecting link. The Yellow Rattle has the edges of the capsule bordered with a kind of margin, and the seeds inclosed in a loose membrane; when they are ripe they make a rattling noise in the capsule. There is a variety with very narrow leaves, the blossoms of which are yellow with purple lips. The stalk of the Eyebright is much branched and square, the branches opposite to each other, the leaves sitting on the stem, those nearest the flowers sometimes purplish; the flowers of a dusky red, growing in spikes, inclined all one way, and nodding at the top. The tips of the stamens are pointed with a thorn or spire at the base of the lower lobe, and the capsule is divided into two cells. The corolla of the Figwort† has a large globular tube, with a very narrow border, divided into five segments; the two upper ones erect, and larger than the rest; those on the sides spread open; and the lower one turned back: in some

* *Melampyrum.*† *Scrophularia.*

species

species, there is another small segment, lying like a flap under the uppermost division. The common Toadflax * grows very commonly upon banks by road sides, which it embellishes with its beautiful heads of flowers, growing upon an erect stalk, thickly beset with long, narrow leaves, of a bluish colour; the under lip of the corolla is hairy within, and, by projecting, closes the mouth; the chaps are orange-coloured, but the rest of a pale yellow: the blossom terminates in a long spur. Although the Toadflax has great claim to admiration for its beauty, it is far excelled by the purple Fox-glove†, which is one of the most splendid flowers that grow wild in this country. The stem rises from three to six feet high, and is adorned with pendulous bell-shaped flowers, hanging one above another in a very long spike: they are of a fine purple, elegantly mottled withinside with spots like eyes; the segments of the calyx are of an oval pointed shape, and the leaves large and wrinkled. Mrs. Snelgrove waits for me to accompany her to gather flowers, to fill the vases in the hall. I shall be no longer confined to the humble productions of the field or the hedge, but shall indulge my taste in composing a garland from among the richest of Flora's beauties. Adieu! Adieu!

FELICIA.

* *Antirrhinum.*

† *Digitalis.*

LETTER XX.

DEAR CONSTANCE,

Shrubbery, July 1.

WITH pleasure do I retire from other company, to devote an hour to the agreeable employment of chatting with you, and renewing botanical topics. Suppose me seated in our dressing room, with many specimens before me of the class Tetradynamia, which is known by the same number of stamens as the sixth class, in which they are all nearly of equal length; but, in the fifteenth, which we are now going to examine, four of them are longer than the other two. The plants of this class are innoxious, and are generally supposed to be antiscorbutic. The form of the seed-vessel divides the plants of this class into two orders; the first called Siliculosa, comprises those that have a short roundish pod or pouch for a seed-vessel; frequently furnished with a shaft, in some kinds as long as the pouch itself. This order is naturally subdivided into those which have a notch at the top of the silicle or pouch, and those which are entire. In the second order, called Siliquosa, the seeds are contained in a long slender pod. The natural character of these flowers corresponds so exactly with my description of the

Stock

Stock Gilliflower in a former letter, that I shall only refer you to that, without enlarging on particulars, and teasing you with a repetition of what I have already told you. Whitlow-grass*. Awlwort†, Camline‡, and Cresset§, are among those which have the seed-vessel entire; the first has its seeds contained in a short, oval, flat pod, without any shaft: it is a diminutive plant, and flowers very early. Awlwort has an egg-shaped pouch, furnished with a very short shaft: it is found at the bottom of large lakes. Camline, called by the country people Gold of Pleasure, has also an egg-shaped pouch, with a permanent shaft. The pouch in Cresset is of a globular form. The Shepherd's Purse¶ is a familiar example of the second subdivision. You need not go far out of your way in search of it, for it grows almost every where; the proper season for its flowering is in the months of March and April, but its blossoms are seen nearly the year round. The soil, from whence it derives its nourishment, has great influence, both upon its height and the shape of the leaves: in some places it is no more than three inches high, in others it reaches to as many feet. It has obtained its name from the shape of its pods, which are like an inverted heart, deeply notched at

* Draba. † Subularia. ‡ Myagrum. § Vella.

¶ Thlaspi.

top, and obviously distinguishing it from the others among which it ranks.

The second order is also separated into two sections; in the first the leaves of the cup approach each other towards the top, closing the cup; in the second they diverge or spread wide open. Wormseed*, Turkey-pod†, Wallflower‡, and Cabbage§, are among the former. The pod in Wormseed is long and narrow, with four edges; the common sort is known by the pods growing close to the spike. Winter-Cresses, another species, has lyre-shaped leaves, with a circular segment at the end; and a third sort, called Jack by the Hedge, or Sauce-alone, from its smell resembling Garlick, has leaves of an heart-shape and white blossoms. Turkey-pod is furnished with four honey-cups, each composed of a small reflex scale, fixed to the bottom of the receptacle, within the leaflets of the calyx. The Mouse-ear, one of the species, has white blossoms, and the leaves sitting close to the stem. Cultivation has produced many beautiful varieties of the Wallflower, both double and single, differing in colour from the pale yellow to the deep orange; but none of them excelling the wild kind in fragrance. The base of each of the short stamens is surrounded by a honey-cup gland, that causes the hunched appearance of

* Erysimum. † Arabis. ‡ Cheiranthus. § Brassica.
the

the cup, which you may have remarked. Both Cabbage and Turnip have four honey-cups, one placed between each short stamen and the pointal, and one between each pair of the longer stamens and the cup; the leaflets which form the calyx are erect, and the claws of the petals nearly as long as the cup; the pod is shaped like a cylinder flattened at the sides, having valves not so long as the partition, and containing several globular seeds. Thus far they agree; but the root of the Turnip differs materially from that of the Cabbage; it is a continuation of the stem, forming that round, compressed, fleshy substance which we eat, and which affords wholesome nourishment to cattle as well as man. In the second section we shall find Sea-Colewort *, Woad †, Mustard ‡, and Water-Cress §. The essential character of the first depends upon the four longer filaments being forked, and the anthers fixed on the outer forks. Woad has a spear-shaped, oblong pod, with one cell and two valves, which are boat-shaped; in the centre of the seed-vessel is one seed only. That species which has the root-leaves scolloped, and those on the stem arrow-shaped, with yellow blossoms, was used formerly by the ancient Britons to stain their bodies, in order to render them more formidable to their enemies, by their terrific

* Crambe. † Isatis. ‡ Sinapis. § Sisymbrium,
appearance;

appearance; it has since been found of extensive utility in the art of dyeing, forming the basis of many colours, particularly blue. Mustard differs from Cabbage, although nearly allied to it, in having an expanding cup and the claws of the petals upright. In both, the honey-cup glands are placed in a similar manner. The pod is rough, and the partition usually much longer than the valves. One species, abounding in corn fields, has a smooth pod, with many angles, bunched out by the seeds. The leaves are harsh and deeply indented; the blossom it bears is yellow, which produces brown seeds. The common sort (whose seeds, reduced to powder, we use to season our food) has also a smooth pod; the lower leaves are large and harsh, but the upper ones smooth and without indentures: not only the blossom is yellow, but the cup also. The Water-Cress, so well known for the wholesome and pleasant salad it affords, is mostly found in running waters, such as brooks and rivulets. The corolla, as well as the calyx, is expanding in this numerous genus, and the valves of the seed-vessel are straight, and shorter than the partition. The characters that distinguish the common species are pods declining, and wing-shaped leaves with white blossoms, which grow in a corymb. Having given you a sufficient number of examples in this class to spur your
your

your industry to search for more, I shall bring my letter to a conclusion, and take the advantage of a fine afternoon to enjoy a dish of tea with my mother in the summer-house. How I wish you could be of the party! that addition would complete the pleasure of your truly affectionate sister,

FELICIA.

LETTER XXI.

DEAR SISTER,

Shrubbery, July 9.

AS the season is stealing on us apace, I am impatient of delay, being desirous of conducting you through all the twenty-four classes of Linnaeus before your return; next summer I promise myself the pleasure of recapitulating our first principles, and applying them to new objects together, which will give us an opportunity of trying our strength, and confirming what little knowledge we may have acquired. We are now arrived at the sixteenth class, which differs, in many respects, from any that we have hitherto considered. In all the preceding ones you may have observed, that the stamens, whether
few

few or many, have been evidently distinct from each other; but in the present instance you will always find them united at bottom into one brotherhood, as it is called, and that is the meaning of the Greek name *Monodelphia*; but still they are perfectly separate at top, which is a distinction that characterises this class from some succeeding ones. The number of stamens being unnecessary to determine the class, is used for a different purpose, and the orders are arranged according to the number of them in each flower. The features by which this natural tribe is recognised, are a cup that is permanent, and, in many instances, double; a corolla, composed of five petals, shaped like a heart reversed, the edge of one lying over that of the next, in an opposite direction to the apparent motion of the sun; the anthers fixed sideways to the filaments, which are of unequal lengths, the outer ones being the shortest; the receptacle rises in the midst of the flower like a column, the top of it encircled by the upright seed-buds, in the form of a jointed ring; all the pointals are united at their base into one body with the receptacle, though divided at top into as many parts as there are seed-buds; these seed-buds become capsules, the number of the cells are regulated by the number of the pointals; the figure varies in different genera, and they frequently consist of as many seed-coats

coats or arils, each concealing a kidney-shaped seed. Decandria, so denominated from having ten stamens, is the first order of which I shall treat; it comprehends but one genus of those plants that grow wild in Great Britain, but that is a very numerous one, and is known by the name of Cranesbill*. The beautiful family of Geraniums, of which our greenhouse displays such an amazing variety, is of the same genus; but as most of these came originally from the Cape of Good Hope, I shall leave them to your own examination, and proceed to select a few native specimens. The circumstances common to the different species are a single cup of five leaves, the petals of the corolla corresponding with them in number; the ten stamens alternately longer and shorter, but all of them shorter than the blossom; one pointal terminated by five stigmas, longer than the stamens, and permanent as well as the cup; the fruit composed of five dry berries furnished with a bill, each containing a single seed, crowned with a tail or awn, which rolls up in a spiral form when the seed becomes ripe; and thus they are detached from the flower, and scattered about, in order to pre-

* Geranium. Those plants which formerly constituted only one genus, under this name, it has been found expedient to divide into three—*Erodium*, *Pelargonium*, and *Geranium*. The former is constituted by those with five, the second by those with seven, and the third by those with ten stamens.

serve the species. Every other stamen only, is furnished with a tip in some species. The awn of the seed is sometimes hairy, and in other instances smooth. The Hemlock-leaved Cranesbill, as well as the musked, has but five stamens; in both the leaves are winged and jagged at the edges, and several flowers grow on the same foot-stalk; but the latter is known by a strong smell of musk, which it loses upon being bruised. In the next section are found ten stamens, all tipped with anthers, and the fruit-stalks supporting two flowers. The spotted Cranesbill has downy leaves, with five lobes or scollops, and these again divided into small indentures: the blossoms are of a deep purple. In the Meadow Cranesbill they are of a fine blue; the petals are entire, and the leaves are wrinkled and divided deeply into many parts. In woods, and especially under the hedges which surround woods, is frequently found the herb Robert, which loves a shady, sheltered situation; the stalks are as red as blood, and towards the end of the year both stalks and leaves become of the same colour. It is distinguished from others of the same genus, by its hairy, pointed cups, with ten angles; the blossoms are of a pale rose-colour, though sometimes a variety occurs with white ones. Many stamens in one flower characterise the sixth order. Lavatera, or Velyet-leaf, has a double cup; one

G

leaf,

one leaf, with three shallow clefts, forms the outer one; the inner one is also of one leaf, but divided into five clefts; the seed-coats compose a ring round the receptacle, which stands like a pillar in the centre of the blossom: the species found here has a woody stem, and downy plaited leaves with seven angles; it grows on the sea-shore. The stem of the Dwarf Mallow* is prostrate; the leaves circular and slightly indented; the fruit-stalks declining. Before the art of gardening had attained the perfection of modern times, the leaves of this plant were brought to table as those of the Cabbage are at present. The common kind, which abounds in hedges, foot-paths, and amongst rubbish, has an upright stem; the leaves have seven sharp divisions; both foot-stalks and leaf-stalks are hairy. It is often cultivated, and many varieties produced. The Marshmallow† is marked by its simple, downy leaves, as soft as velvet; the blossom resembles that of the Mallow. It is valued for its medicinal, healing qualities, being generally useful as an external application, in those cases where cooling, softening remedies are necessary. Before you dismiss the Mallow tribe, take your microscope, and examine the dust of the anthers; it will afford you entertainment, being curiously toothed like the wheels of a watch. The most

* Malva.

† Althæa.

minute

minute parts of nature are finished with an elegant nicety, that surpasses the utmost efforts of art. The finger of the Divine Artist is visible in the most minute of his works: let us be excited to observe them with the greatest attention; they will not only supply us with present amusement and wonder, but will serve as a hidden treasure to alleviate the solitude and wearisomeness of old age. May a similarity of taste and sentiment continue to unite us in the same pursuits to the end of our days.

FELICIA.

LETTER XXII.

DEAR CONSTANCE,

Shrubbery, July 14.

THE leguminous plants, or butterfly-shaped flowers, are comprehended in the seventeenth class, Diadelphia. The disposition of the stamens distinguishes the class, and the number of them the orders *. In the first order there are five stamens, in the second six, in the third

* None of the plants included in it are noxious to the larger animals, though some foreign species intoxicate fish.

eight, and in the fourth ten. The signification of the Greek name is two brotherhoods; and you might expect, from that circumstance, to find them always divided into two sets; but this is not invariably the case, for in many instances they are united in one set only. The natural character you have already studied pretty attentively, under the description of the Pea-flower, which will serve to give a general idea of all the rest. The three first orders will furnish me with only two genera for your inspection. Fumitory* has but two filaments, each of them crowned by three anthers, which is sufficient to place it in the second order. It has a cup of two leaves, and the blossom partakes more of the form of the ringent than the papilionaceous flowers; the upper lip, however, corresponds to the banner, the lower one to the keel, and the cloven mouth to the wings. Common Fumitory bears the seed-vessels in bunches, each containing a single seed: the leaves are doubly winged, with three divisions, and these again subdivided. The blossoms are produced in long spikes at the end of the stalks, and are of a pink and deep purple. There is but one species of Milkwort†, though the genus is numerous, which grows without culture, and that is found on heaths and poor meadow ground. It is ranked in the third order,

* Fumaria.

† Polygala.

Octandria,

Octandria, on account of its eight filaments, each being tipped with anthers, which are united at bottom. The wings may be said to belong to the cup, as they are formed of two coloured leaves which proceed from it. The banner is generally cylindrical; towards the end of the keel, which is hollow, are fixed two appendages, pencil-shaped, with three divisions; many species are without this distinction, which throws the genus naturally into two sections. The flowers of the wild sort are furnished with this crest; they grow in bunches on herbaceous stems, which are trailing: the leaves are narrow, and the mixture of blue, white, and flesh-coloured blossoms, has a pretty effect. The plants of the last order are numerous, and bear such an affinity, in their general appearance, that it is not difficult to recognise them at first sight. The papilionaceous blossom; the leaves mostly in pairs, like wings, up the leaf-stalks; sometimes terminated by a single one; stalks slender and creeping, unable to support themselves, and twisting round every thing near them; frequently furnished with tendrils, or clasps, for the purpose of holding by the first prop they can reach; are features that denote them to belong to the same family. But this air or character must always be confirmed by the union of the ten filaments at the bottom, which puts the matter beyond doubt; remembering

what I have already observed, that although the essential mark of the class is the separation of the stamens into two sets, nine of them inclosed together by a membrane surrounding the germ, and the tenth placed by itself above the pointal; yet in many species they grow all ten together, which must not deter you from arranging them amongst their proper companions. Several trees and shrubs are found with butterfly-shaped blossoms, and possessing the requisites of the class, are ranked in it. Among the shrubs are the Broom* and the Genista, adorning the hedges of dry pastures by their showy yellow flowers; the ten stamens are connected in both: the leaves of the former grow in threes, and the branches are without prickles; in the latter, the leaves are glossy, narrow, and upright, and the branches streaked. You can scarcely pass over a heath or common that is not covered with Gorze†, or Furze, which, though so common here, is uncommon elsewhere. Linnæus never saw it till he came into this country; till then he also never saw the Harebell. It differs from the Broom and Genista, in having a cup with two leaves, and the legume so short as to be almost covered by it. This is an extremely hardy shrub, and, on that account, is suitable for fences in the bleakest situations; not even the sea-spray de-

* Spartium.

† Ulex.

destroys it, which kills almost every other. A calyx, with five divisions, nearly as long as the blossom, and the ten filaments united in one entire cylinder, distinguish the Restharrow*, which are lowly shrubs, growing also on heaths and barren places. The Dutch sow them on the banks of their dykes, as their strong, matted roots tend to fortify them against the incursions of the water. The Wood Pea† has a calyx of one leaf; the standard of the corolla reflected back; the wing approaching and rising upwards: nine of the filaments are united beneath the pointal, but the tenth is placed above it, and ascends upwards. It is an elegant plant, the stem simple below, but branched towards the top, bearing three or four purple blossoms on a branch, which become blue as they go off, and are succeeded by a legume, which likewise changes from red to black: the separation of the branches are clothed with half arrow-shaped props, often jagged at the bottom. The Highlanders dry the roots, and chew them like tobacco, to repel hunger and thirst. The chief distinction between the Pea‡ and the Vetchling§ consists in the shaft: in the Pea it is triangular, keel-shaped, and woolly; whilst that of the Vetchling is flat and upright, with a woolly summit. Some species produce only one flower on a foot-stalk, among which are the Yellow Vetchling and Crimson Grass

* Ononis.

† Orobus.

‡ Pisum.

§ Lathyrus.

Vetch; the former having tendrils without leaves, and props shaped like the head of an arrow; the latter has simple leaves and awl-shaped props. Some others bear several flowers on a fruit-stalk, as the rough-coddled Chickling Vetch, which has spear-shaped leaves, with hairy shells and rough seeds. The blossoms are crimson, streaked with yellow lines withinside. In the same division are the broad and narrow-leaved Peas everlasting: they agree in having tendrils furnished with two leaves, which in the one do not exceed the breadth of the stem; but in the others are much broader. The Vetch*, or Tare, is marked by having the stigma of the pointal bearded on the under side: the filaments are divided into two sets, and the genus into two sections; the first bearing the flowers on peduncles; the second producing them at the base of the leaves, sitting almost close to the stem. Of the former section are two species, one with little oval leaves and white blossoms, the other with spear-shaped downy leaves and purple blossoms. Among those of the second section, one generally produces two legumes growing together, another four, and in a third sort they grow single. There are many species of the Trefoils†, their flowers forming a little rundle or head upon a common receptacle; the wings of the corolla are shorter

* *Vicia*.† *Trifolium*.

than

than the standards, which is reflected, and the keel still shorter than the wings. The subterranean Trefoil takes its name from its shells being frequently produced under the surface of the earth: the heads are woolly, containing five flowers, with a bushy substance in the middle, involving the seed-vessel. Saintfoin* is cultivated like clover, for feeding cattle. It loves a dry, chalky soil; the leaves are winged, and the shells covered with prickles, each shell containing a single seed. The essential character of the Horseshoe† consists in the form of the shell, whence it takes its name. The shape of the legume particularises the different species of Snail-shell‡: in some it is rolled up spirally, like the shell of a snail, or a green caterpillar; in others it is of a semicircular form, resembling a bow or a crescent. Shall I intrude, my dear Constance, by introducing the next class, before I close my letter; as it contains but one genus natural to this country, I am unwilling to appropriate a letter to it only, trusting to your usual patience to forgive me, if I weary you. The circumstance of the stamens being united by the threads into three or more sets, gives the name of Polyadelphia to the eighteenth class. The only genus I shall mention is the Tutsan§, which has a cup with five divisions, inclosing the seed-bud; and a

* *Hedysarum*. † *Hippocrepis*. ‡ *Medicago*. § *Hypericum*
G 5 blossom

blossom of five petals, bending from the left to the right; its numerous hair-like threads, connected at bottom, into three or five sets, like a hair pencil with small tips: the shafts vary in number, from one or two, to five; the seed-vessel is a capsule, with as many cells as there are shafts. Park-leaves, or Tutsan St. John's Wort, has three pointals; its blossoms are yellow, which are succeeded by a berry; the stem is shrubby and two-edged. Common St. John's Wort has the same number of pointals, and a stem resembling that of the last-mentioned kind; but it differs from it in its leaves, which are blunt, and sprinkled with transparent spots, that are sometimes red: another species has prostrate, trailing stems, the flowers growing singly at the base of the leaves. Among hedges, and on rough grounds, is found the hairy St. John's Wort, with upright cylindrical stems, and downy egg-shaped leaves. Adieu! I perceive the approaches of autumn with pleasure, considering them as forerunners of that period, which is fixed for your return to your affectionate

FELICIA.

LETTER

LETTER XXIII.

Shrubbery, August 5.

RECAL to your mind, my dear Constance, what I formerly told you of the compound flowers described in the system of Linnaeus, in the general account of the nineteenth class, Syngenesia. Before I proceed to point out the peculiarities of the different genera, it is necessary to acquire pretty accurate ideas of the structure of the parts which compose the different kinds of compound flowers, as well as the distinctions of the orders into which the class is divided. The essential character of a compound flower does not consist in the composition of many florets, but in the union of the tips at top into the form of a cylinder, and a single seed being placed upon the receptacle under each floret. Though the flowers of this class generally are composed of many florets sitting upon a common receptacle, enclosed by one common empalement. Sometimes this calyx consists of a single row of scales or leaves, divided to the base, for the convenience of closing or opening without tearing; in other genera, the scales are numerous, lying one above another in rows, like

the tiles upon the roof of a house; whilst the cups of some are formed of a row of equal segments next to the florets, and another row of short scales grow at the base of the longer ones, and turn back towards the foot-stalk. The surface of the receptacle is of different forms, concave, flat, convex, pyramidal, or globular, and is either smooth, full of little holes, or beset with soft hairs, or small upright scales, which separate the florets placed upon it. A floret consists of one petal, mostly regular, and the border divided into three clefts; the five filaments of the stamens are fixed to the tube of this corolla, and unite at top, so as to form a cylindrical tube, through which passes the shaft of the pointal; the summit mostly rising above the floret, and terminating in two curling forks. The floret and pointal both rest upon the seed-bud, which lengthens as the seed becomes mature: if it be a naked seed it falls to the ground when ripe; but if winged, or tipped with feathers, it wafts its way through the air to a distance, and there produces a new plant the following season. This downy substance, or crown of feathers, is either sitting close to the seed, or fixed on the top of a pedicle, like a small pillar. The natural tribe under consideration will furnish you with much subject of admiration, and bring new proofs to your reflecting mind, that those parts of organised nature,

nature, which appear to a casual observer as trivial and insignificant, are contrived with the most perfect wisdom and intelligence, and with design to answer particular purposes. Who can observe, without wonder, the elasticity of the calyx in many genera of this class? The expansion of the florets appears to burst it open, but when they wither it rises up and closes, by which means the tender seed is protected till it is fit for dispersion; the hairs that crown the seeds, before upright, diverge, and force the leaves of the calyx open again, which now bend quite back, and leave a passage for the seeds to escape. For the distinction of the orders I must refer you to my eighth letter. The order Polygamia Æqualis is subdivided into three sections. In the first all the florets are narrow, or corresponding with the Semiflosculous flowers of Tournefort; in the next the flowers grow in globular heads; and the third is composed of those which have tubular florets only. Endive* has a double cup, the receptacle a little chaffy, and the feather five-toothed. The blossoms of the wild Succory or Endive are blue, and grow in pairs sitting on the stem; the leaves are notched. Goatsbeard†, Oxtongue‡, and Dandelion§, agree in having a naked receptacle, and a downy feather; but the cup in Goatsbeard is

* Cichorium. † Tragopogon. ‡ Picris. § Leontodon.
simple,

simple, composed of eight spear-shaped leaves; those of the plant are entire, stiff, and straight. This is one of Flora's time-keepers: the blossom expands early in the morning, and closes again before noon. Oxtongue has a double cup and a yellow blossom. The empalement in the Dandelion is tiled; the leaves are deeply jagged: the round white heads, formed by the expansion of the downy feathers, you are too well acquainted with to need description, as they have so often amused our infant hours with blowing them off the receptacle. The second section presents us with the Thistle† tribe, disregarded on account of their uncouth, harsh appearance, and their abundance; but neither destitute of beauty, on further inspection, or void of utility: for nothing would grow for years on clay newly thrown up, were it not, that the seeds of thistles fix and vegetate there, and as they grow up, shelter other plants, which arrive at maturity under their protection. Many of the species have latterly been introduced into gardens, and become beautiful by cultivation. An empalement, beset with thorny scales, and a receptacle with hairs between the seeds, characterise this intractable race. The leaves of many of the species run along the stem; their thorny edges forbid a very close approach. The Milk Thistle

* *Carduus*.

has the leaves prettily marbled with white; they are halbert-shaped, with thorny, winged clefts. The banks of rivers and brooks will afford you the Liverhemp*, as a specimen of the third section; a large plant with fingered leaves: the stalks are tall and rough, and bear bunches of pale red blossom, each cup containing about five florets. The genus is known by a tiled, oblong cup; a naked receptacle; a downy feather; and a very long pointal, cloven down to the stamens. The second order, Polygamia Superflua, is divided into two sections; the first containing those that have all the florets tubular; the second, those that are radiate, and in which the florets of the circumference are narrow or strap-shaped. The genus *Artemisia* includes Southernwood, the Wormwoods, and Mugwort, each of which possess the quality of an aromatic bitter. They are known by a roundish empalement, composed of many circular scales, naked seeds, and a flat receptacle, which is either woolly or bare. The flowers in this order are called discoid, and their rays are obscure; those of the genus *Artemisia* are awl-shaped. Wild Southernwood has leaves with many clefts, and long tender shoots proceeding from its trailing stems. The Common Wormwood is distinguished from it by upright herbaceous stems; the flowers are rather globu-

* *Eupatorium*.

lar and pendant; the leaves are compound, with many divisions; the blossoms of both are brownish, a colour unusual among flowers: nature appears to delight in displaying the gayest hues in the vegetable part of the creation. Tansey*, with the juice of which puddings are frequently flavoured, has an emblement shaped like a globe, divided in half, tiled with sharp scales; the flowers of the ray have only three clefts, but those of the disk five; both the seeds and the receptacle are naked. The common Tansey bears yellow blossoms; the leaves are doubly winged, and jagged at the edges. The flesh-fly has such a dislike to the smell of this plant, that any animal substance, such as meat, &c. that is rubbed with it, is perfectly secure from the attacks of this insect. The Daisy†, which enamels every meadow with its vernal and autumnal flowers, belongs to the second division: the cup is formed of a double row of small spear-shaped leaves; the numerous tubular florets in the disk are furnished with both stamens and pointals, while those which compose the ray are strap-shaped, and contain pointals only: the seeds are without a feather, and the receptacle naked and conical. Apply your microscope, and you will be pleased with the beauty and variety discernible in this little disregarded flower. The

* Tanacetum.

† Bellis.

florets

florets of the centre are yellow, those of the ray white above and pink beneath; the leaves of the common sort are oblong and blunt, and spread flat upon the ground; a naked stalk supports a single flower. Both Chamomile* and Yarrow† have chaffy receptacles, but the calyx of the first is hemispherical, or of the shape of a globe divided in half; whilst that of the latter is oblong or egg-shaped, and tiled with sharp scales. Chamomile has more than five semiflorets in the ray, and the seeds are without down. The species that is used medicinally, as well as several other species, has yellow florets in the centre, surrounded by white ones in the circumference; the leaves are winged and compound, with sharp, narrow divisions, the whole a little hairy: cultivation renders it double, by increasing the number of the florets in the circumference, and diminishing those of the centre. The leaves of the common Yarrow are doubly winged, and without hairs; the stem is furrowed towards the top; it bears a white blossom, sometimes tinged with red or purple. Were I to enumerate all the genera of this numerous order, I should extend my letter to an unreasonable length, therefore you must be contented with those already noticed, and suffer me to proceed to the third order, from which I

* *Anthemis*.† *Achillea*.

shall

I shall select only the Knapweed†. In this genus the scales of the cup and the feathers of the seed vary in different species; the corollas of the ray are tubular, longer than those of the disk, and irregular in their form: the receptacle is furnished with bristles between the florets. There are many varieties of the Blue-bottle or corn-flower, if we enumerate them by the colour of the blossom, which is sometimes white, red, purple, violet, or variegated with different hues; but, in all, the scales of the cup are fringed, the upper leaves are narrow and entire, but those towards the ground are broader, and toothed at the edges. Great Knapweed has leaves with winged clefts, and bears its blossoms on long, naked fruit-stalks: another species, called Horse-knops, has skinny, ragged cups, with spear-shaped leaves and angular branches: there are two other species with cups doubly spined: one of them, called Star-thistle, has strap-shaped, toothed leaves, with winged clefts and a hairy stem. St. Barnaby's Thistle is known by its spear-shaped leaves running along the branches; those nearest the root are lyre-shaped and winged. The generic characters of Cudweed‡, the only specimen I shall mention of the fourth order, are, a naked receptacle, seeds without down, and florets with pointals fixed among the scales of the calyx.

* Centaurea.

† Gnaphalium.

Barren pastures and sandy corn fields produce the different species, which are chiefly distinguished by the form of the flowers; in one kind they are round, in a second conical, and in a third awl-shaped.

Rejoice with me, that I have at last reached the conclusion of this very long letter, and believe that I shall ever remain, with undiminished affection, your

FELICIA.

LETTER XXIV.

DEAR CONSTANCE,

Shrubbery, August 10.

THE twentieth class, Gynandria, is distinguished from all others, by the circumstance of having the stamens fixed upon the shafts of the pointal itself, or upon a receptacle lengthened out into the form of a shaft; whereas, we have hitherto observed, that these parts have been perfectly separate and independent of each other. The orders are marked by the number of stamens in each flower. The first, called Dian-dria, from having always two stamens, contains a
natural

a natural tribe so nearly allied, that the form of the nectary alone affords a distinction to the several genera. The structure of these flowers is very singular, as well as that of the root; each claims your particular attention. In some species the root is composed of a pair of solid bulbs; in others it consists of a set of oblong, fleshy substances, tapering towards the ends, like the fingers of the hand. The unusual situation of the parts of fructification in the plants of this family gives the blossoms a very peculiar appearance, and renders an accurate description of them necessary. The oblong seed-bud is always placed below the flower, twisted like a screw; a spathe or sheath supplies the want of a proper calyx; the corolla has five petals irregularly shaped, the two innermost uniting over the others in the form of an arch; the nectary forms the lower lip, and stands in the place of the pointal and a sixth petal; to the inner edge of the nectary adheres the shaft, which, with its stigma, is scarcely distinguishable: the stamens are very short, and are also fixed to the inner rim of the honey-cup; the tips have no covering, their texture resembles the pulp of oranges; two small cells, opening downwards, inclose them, and almost conceal them from observation. The spiral germ is converted into a capsule of three valves, opening at the angles under the keel-shaped ribs; within

within is one cell, containing many seeds like saw-dust, growing upon a narrow receptacle upon each valve. The most numerous genus of this order is the Orchis, known from the rest by its horn-shaped honey-cup; the form of the roots throws it into three divisions: among those with double bulbs is the Butterfly Orchis, perhaps so called from its expanding petals; the horn is very long, and the lip spear-shaped; its greenish white blossoms emit an agreeable scent, especially in the evening. The Purple, late-flowering Orchis is found in dry pastures; the lip has two horns, cloven into three clefts, equal and entire; it grows about a foot high, with five or six spear-shaped leaves proceeding from the root. There are two kinds very common, called Male and Female Orchis, but without any reason for that distinction; the Male differs from the Female by the outer petals being longer and sharper, and the middle lobe of the cup cloven, and longer than those of the sides; it produces more flowers, and the stem is twice as tall. The blossoms of the Female are white, or red mottled with white, or violet-coloured; those of the Male are of a deep purple. The broad-leaved and the spotted Orchis grow mostly in moist meadows; the roots of both are palmated or hand-shaped, though that of the spotted is more expanding; the first has a hollow stem, and leaves a little spotted; but the
stem

stem of the latter is solid, and the leaves covered with black spots: the broad-leaved has a conical honey-cup, and the lip divided into three lobes, the side ones reflecting back; the horn in the other species is shorter than the germ, and the lip is flat. The general characters already given of the order will suit the next genus, *Satyrium**, except particularising the shape of the nectary, which terminates in a bag like a double purse. The root of the Lizard-flower consists of two undivided bulbs; the leaves are spear-shaped; and the lip of the corolla cut into three segments, the middle one extremely long, and looks as if it had been bitten off at the end; the blossoms are white, inclined to a greenish hue on the outside, but within of a dusky purple; by age the whole corolla changes to a dingy red: this plant sometimes attains the height of three feet. The Twayblades† form another genus, of which the honey-cup is longer than the petals; it hangs down, and is keeled on the back part. It is this keel that, in some species, bears so close a resemblance to particular insects, as almost to deceive the eye at a distance. Common Twayblade has a fibrous root, and a stem with only two leaves, which are egg-shaped. The lip is bisected. The stem of Triple Ladies' Traces is somewhat leafy; the flowers grow spirally, and

* *Satyrium*.† *Ophrys*.

all point one way; the lip is not divided, but only notched with a small scollop, the three outer petals are glued together; it flourishes in barren pastures, and seldom rises to a greater height than five or six inches. The curious kinds of Fly and Bee Orchises, concur in double roundish bulbs and a stem furnished with leaves. The Fly Orchis has the lip of the honey-cup cloven into four clefts; the wings and helmet are greenish. The lip of the Bee is divided into five lobes, bent downwards; the outermost petals are large and spreading, of a purple colour; the two innermost green; the lower lip of the honey-cup is cut into three segments, and is shorter than the petals; the colour is brownish purple, mixed with yellow; the upper lip is the longest, narrowing to a point, and is green: the filaments are long, and the anthers very large; the seed-bud exceeds the petals in length, but does not equal that of the floral leaves. Search for the admirable deceptions among the grass in chalky soils; their beauty will amply repay your trouble. Lady's Slipper*, so named from the shape of the nectary, which is fancied to resemble the form of a slipper, has fibrous roots: the stem rises about a foot high, and is leafy; the leaves are between egg and spear-shape; the purple petals are set off to advantage by the pale yellow honey-cups. The Cuckoo Pint†, which we have fre-

* *Cypripedium*.† *Arum*.

quently gathered under the vulgar name of *Lords and Ladies*, is found in hedges, where, in spring, it makes its first appearance by a very large oblong leaf, in the centre of which is a club-shaped fruit-stalk or receptacle, naked on the upper part, but covered with seed-buds at bottom, and with anthers in the middle, so that the filaments are unnecessary: as the plant approaches to maturity, the sheath opens and unveils the club, which varies gradually, from a yellowish green, to a fine red purple; when this withers, it is succeeded by a head of round, red berries, which are acrid and poignant, as is the whole plant. This extraordinary genus has perplexed botanists where to place it.

The unusual figure, as well as beauty, of many of the plants described in this letter will surely serve you for entertainment, till I have leisure to write again: in the interim, be assured of my entire affection.

FELICIA.

LETTER

LETTER XXV.

DEAR CONSTANCE,

Shrubbery, August 13.

THE twenty-first class, Monoecia, which now falls under consideration, differs in a very essential particular, from any yet observed; we are no longer to look for perfect flowers within the same empalement, but may expect to find the blossoms of an individual plant varying in character, some bearing stamens only, and others pointals alone: the former are barren, yielding no seed; but the pistilliferous flowers produce a germ, furnished with seeds. The very numerous tribe of Sedges *, having three stamens, belongs to the third order, and generally grows in bogs and marshy places: both kinds of flowers are borne on catkins, consisting of scales, each containing a single flower; neither kind has any corolla: the fertile flowers have a three-toothed nectary, which is puffed up, and within which is the triangular seed-bud, a very short shaft with three stigmas; and lastly, a three-cornered seed. Some of these have but one spike; others have many, composed of fertile and barren flowers promiscuously; but they are more usually found on

* Carex.

H

distinct

distinct spikes. In the latter division is one species, of which the upright spikes grow together by threes, the barren one terminating, and the two lower fertile ones being always black; a little leaf, longer than the spike, grows beneath the lower one; the bright green leaves are long and narrow, and the stem is a naked straw, with three equal flat sides: by means of this plant, boggy mosses are converted into firm, useful land. The Burreed* and the Reedmace† have a near affinity to each other: in the first, the flowers of both kinds grow in a roundish head, the barren ones above, and those with pointals beneath; each has a similar empalement, consisting of three leaves; the summits are two; and the seed is as hard as bone. Neither of these plants has any corolla; the catkin, in the Reedmace, is formed like a cylinder, close set with flowers of both kinds, arranged in the same order as those of the Burreed; the cup of the stamiferous flowers has three bristle-shaped leaves, but that of the pistilliferous ones, only feathered hairs, and a single seed supported in a kind of bristle. The greater Burreed has upright, three-cornered leaves; but those of the smaller kind are drooping and flat: the Great Catstail, or Reedmace, reaches to the height of six feet; the leaves are very long and narrow, and sword-

* *Sperganium*.† *Typha*.

shaped;

shaped; the two spikes grow near together; but, in the lesser kind, they are more distant, and the leaves are semi-cylindrical. In the fourth order, Tetrandia, you will find Roman Nettle*: the stamiferous flowers have a cup of four leaves; instead of the petals, a honey-cup is placed in the centre of the flowers: the pistilliferous flowers are not always on the same plant, but are sometimes seen on distant ones; they have a cup formed of two valves, which closing supplies the place of a seed-vessel; they have no corolla. The disagreeable effect of the stings you have doubtless felt; let them make you amends, by amusing you in the microscope: in shape they resemble the stings of insects; long, tapering, and finely pointed. Notwithstanding their minuteness, they are hollow, and convey a poisonous fluid, which lurks in a small bag at the base of the sting: upon the sting meeting with resistance, it presses upon this little bag, and acts like a syringe. Both kinds of flowers proceed in bunches together, from the buds, of the Box Tree†; those which are barren have a cup of three leaves, a corolla of two petals, and the rudiment of a seed-bud, without either shaft or summit: the fertile flowers have a four-leaved calyx, a three-petalled corolla, three pointals, and a three-celled capsule, with three bills,

* Urtica.

† Buxus.

opening as a spring three ways, each cell containing two seeds; the blossoms are greenish, and the leaves oval, thick, and glossy, and, by their duration through the winter, contribute to the beauty of plantations and pleasure-grounds in that dreary season. There are many varieties, but they all belong to one species. The Birch* produces each kind of flowers in separate catkins, which are composed of scales; those which are stameniferous have three flowers, in each scale; the flowers consist of three equal florets, with four small clefts. The pistilliferous catkins have only two flowers in each scale, without any perceptible corolla; but these are succeeded by seeds, bordered by a membrane. The Alder is of the same genus, and differs from the common Birch in its branched fruit-stalks, and round, clammy, notched leaves; whereas, those of the birch are egg-shaped, tapering to a point, and the bark is white, smooth, and glossy. Several stately trees are included in the eighth order, Polyandria; the Oak, the Beech, the Hazel, and the Hornbeam. The Oak†, so valuable for its timber, and the various useful purposes to which its different parts are applied, claims precedence. The barren flowers hang upon a loose catkin; their calyx is of one leaf; blossoms they have none: the number of the

* Betula.

† Quercus.

stamens

stamens is from five to ten; the calyx of the fertile flowers, which are seated in a bud, is like leather, and consists of one leaf; they have one pointal split into five parts: the seed is an oval nut called an acorn, covered with a tough shell, and fixed into the cup. The barren flowers of the Beech * are fixed to a common receptacle, somewhat like a catkin; they have a bell-shaped calyx of one leaf, but divided into five clefts; the stamens are about twelve: the fertile flowers grow from buds on the same tree, and have a calyx with four teeth and three pointals; the calyx becomes a capsule beset with soft thorns, containing two nuts. The Chestnut is a species of the Beech, distinguished by spear-shaped leaves, a little notched at the edges, and smooth underneath. But the Common Beech has egg-shaped leaves, indistinctly notched; and a smooth, white bark; the barren catkins round like a ball. As in several preceding genera, the barren flowers in the Hazel † are formed on a long cylindrical catkin, and the fertile ones at a distance from the others, sitting inclosed in a bud on the same shrub; for the Hazel, Filbert, &c. do not rank with trees: the scales of the catkins bend inwards, with three clefts, each scale containing a single flower, furnished generally with eight stamens; the calyx of the fertile

* *Fagus*.† *Corylus*.

flowers has two upright leaves, jagged at the edge; each flower has two very long, red shafts, with simple summits: the fruit is a nut, to which you are no stranger; neither sort of flowers has any corolla; the leaves of the Common Hazel are oval, pointed, toothed, and wrinkled; the catkins are green at first, but change to brown. In the Hornbeam*, the different sorts of flowers are produced in separate catkins; both have a single flower in each scale; the number of stamens varies, but is generally about ten; the fertile flowers have two germs, each bearing two pointals; the catkins growing very large, inclose the seed at the base of the scales; the leaves are wrinkled, oval, and pointed, and sharply indented at the edges. In the order Monadelphia, I shall remark only the Fir†, belonging to a natural family, called Cone-bearing Trees. The barren flowers are produced in bunches, and have many stamens united below into a pillar, but separated at the top; the fertile flowers grow on a cone, two of them in each scale; they have no corolla, one pointal, and a nut enlarged by a membranaceous wing. In the broad-leaved trees, where the stamens and pointals are produced in separate empalements, either on the same or on distinct trees, the flowers come out before the leaves are fully expanded, that the leaves might not intercept the

* *Carpinus.*† *Pinus.*

dust

dust of the anthers in its passage to the pointals, by which they are fertilized ; but nature, ever an oeconomist, makes no such arrangement among those trees which have narrow leaves, such as the Fir or Yew. This is a remarkable instance of design, and clearly proves that all parts of creation, if properly observed, would furnish us with examples of the wisdom of an infinitely wise Creator, who not only formed every thing in the beginning, but has provided, in a wonderful manner, for their preservation and increase. With this serious reflection I shall conclude, wishing you all kinds of happiness.

FELICIA.

LETTER XXVI.

DEAR CONSTANCE,

Shrubbery, August 17.

THE only distinction between the last class we have examined, and the twenty-second, which we are going to investigate, consists in the disposition of the respective kinds of flowers. In the former class both kinds were produced on the same plant ; but in this, Dioecia, they must be

H 4

sought

sought for on different plants of the same species. This will cost you some trouble, but we may remember my mother's favourite maxim, that nothing is to be obtained without its proportion of labour. The Willow * belongs to the second order: the number of stamens is not always the same in the different species; in some there are three or five, of unequal length, and one kind produces complete flowers within the same empalement. Two is the number that distinguishes the order, and which generally prevails; the genus contains many species that concur in the following characters: each kind of flower grows on a scaled catkin, with a single flower in each scale, which has no corolla; the barren flowers have a very small, cylindrical, honied gland, placed in their centre; in those which are fertile is an egg-shaped seed-bud, tapering into a shaft, hardly distinct from the germ, and terminating in two cloven, upright summits; the capsule has one cell and two valves, and incloses many small seeds, crowned with a simple, hairy feather. The Common Willow being familiar to you, I shall pass it by, and select the Round-leaved Willow for its singularity; most of the tribe flourish in moist, watery situations; but this species is found on mountains. Its leaves are smooth, entire, and egg-shaped; their upper

* Salix.

surface is green and wrinkled; the under one is bluish, and covered with a net-work of veins, which are at first red, but afterwards become green. It is but a low shrub, and produces both flowers and leaves from the same bud. The fourth order presents you with the Mistletoe*; the stamiferous flowers have a cup with four divisions, to each one of which is fixed an anther without a filament: the pistilliferous flowers mostly grow opposite to the others; their cup consists of four leaves, sitting on the germ; they have no style, and the seed-vessel is a globular one, called berry, containing a single, heart-shaped seed: neither kind of flower has any corolla. The seeds of this plant are supposed to be propagated by birds, which swallow them whole, and drop them on the branches of trees, where they vegetate, by insinuating the fibrous parts of their roots into the woody substance of the tree. The White Mistletoe is found upon Willows, Oaks, Hazels, Apple, and Pear Trees, but most frequently upon Crab Trees. It has spear-shaped, blunt leaves; a forked stem: the flowers are produced in spikes, in the bosom of the leaves; the blossoms have a greenish hue; and the berries are white. The Hop† will afford us a specimen of the fifth order: the barren flowers have a cup of five leaves; in the fer-

* Viscum.

† Humulus.

tile ones it is one-leaved, expanding in an oblique manner, and entire; each of these is furnished with two pointals and one seed, and the whole is inclosed within a leafy calyx: neither kind has any corolla; what is generally called a Hop is only a cluster of many of these flowers. The only species known has toothed leaves, divided into lobes; and climbing stems. The Poplar* is comprised in the eighth order: both kinds of flowers grow on oblong catkins, consisting of scales, each scale inclosing a single flower, and ragged at the edge; neither has any petals; both have a turban-shaped nectary, ending obliquely at the top in an egg-shaped border; the fertile flowers have scarcely any shaft, but the summit is divided into four clefts; the seed-vessel is a capsule of two cells, containing many feathered seeds. The Great White Poplar, or Abele Tree, has circular leaves, cut angularly at the edges, and downy underneath. The leaves of the Trembling Poplar, or Aspen Tree, resemble those of the last-mentioned kind, except in having smooth surfaces on both sides; the leaf-stalks are long and flattened towards the ends, which causes the leaves to shake and vibrate with the smallest breeze. In slow streams and wet ditches is found Frogbit†, which belongs to the ninth order; the barren flowers have

* Populus.

† Hydrocharis.

a cup of three leaves, and a corolla of three petals, and grow by threes in a sheath of two oblong leaves; the nine stamens are in three rows, from the middlemost proceeds an awl-shaped little pillar, resembling a shaft; the other two rows are united at the base, and there is the rudiment of a seed-bud in the centre of the flower. Those that are fertile grow solitarily; the cup and corolla are similar to the same parts in the barren flowers; the seed-bud is beneath; there are six pointals; and the capsule resembles leather, with six cells, filled with many small, roundish seeds. There is but one known species, which has smooth, thick, kidney-shaped leaves, and white blossoms. In the order Monadelphia, is the Juniper*; the barren flowers are borne upon a conical catkin, the scales of which serve the purpose of a calyx; they have three stamens, but no corolla: in the fertile flowers the calyx is permanent, and has three divisions growing to the seed-bud, which is beneath; the corolla consists of three petals; the pointals are three: the seed-vessel is a berry containing three seeds, and marked in the lower part with three opposite tubercles, which were formerly the cup; and at the top by three little teeth, which were originally the petals. In the common kind, the sharp-pointed leaves grow by threes, longer than

* Juniperus.

the berry, expanding: it will thrive in almost any soil; but, in some situations, dwindles to a mere shrub. The melancholy Yew*, placed in church-yards, to give an additional solemnity to those repositories of the dead, has neither blossom nor enpalement, unless we chuse to call the bud by that name, which consists of three or four leaves; the stamens are numerous, terminated by anthers with eight clefts: the fertile flowers have an egg-shaped germ, ending in a blunt stigma without any shaft, which is changed to a singular kind of berry, or rather succulent receptacle, open at the end, and of a red colour, having one oblong seed standing out of the open end: the leaves of the common kind grow close together, in a double row along the stem, like the back-bone of some fish, and when fresh are a fatal poison. The Pettigree † is of the fourteenth order, Syngenesia, in which the calyx, blossom, and honey-cup are the same in both kinds of flowers: the first has six leaves; blossom there is none; but an egg-shaped, puffed up honey-cup, open at the rim, grows in the centre of the flower. The barren flowers have no filaments; but they have three anthers, united together at the base, on the end of the honey-cup: the oblong germ in the fertile flowers is concealed within the honey-cup; they have one pointal, and a globular

* Taxus.

† Ruscus.

berry

berry for a seed-vessel, which contains two round seeds: the species called Butcher's Broom bears its flowers on the upper surface of the leaves, which are like those of the Myrtle, except being stiff and prickly at the points; the blossoms are of a yellowish green, and the berries red. I become every day more impatient for your return, as the time appointed for it approaches. Mrs. Snelgrove intends that we shall apply very closely in the winter to drawing, that we may be qualified to delineate the botanical specimens we shall collect the following summer, that, by combining two branches of our education, we may improve in both at the same time. Adieu!

FELICIA.

LETTER XXVII.

DEAR CONSTANCE,

Shrubbery, Sept. 10.

WITH the design of rendering our task more easy, you may recollect that I told you in a former letter, that the plants which formed the twenty-third class in the system of Linnæus, are now more frequently arranged, by modern botanists, amongst the other classes, according to their

their general distinctions ; therefore I shall proceed to the last class, Cryptogamia, which I have already told you includes those vegetables which are of the lowest kinds, whose parts of fructification have hitherto escaped the most attentive researches of learned botanists ; therefore, Mrs. Snelgrove has recommended only a very few of the most obvious to my notice, which, she says, may serve to give us general ideas of the rest. The parts of fructification in the ferns are sometimes produced in spikes, but in general they are found upon the backs of the leaves, and, when magnified, appear to consist of a scale proceeding from the leaf, with an opening on one side ; some little globules lie concealed beneath this scale, supported on foot-stalks, and surrounded by an elastic ring ; when the seed is ready for dispersion, these balls burst, and there issues a fine powder from them, which is believed to be the seeds. Horsetail *, Adderstongue †, and Moonwort ‡, have their fructification upon spikes ; each separate one belonging to the first, is round and gaping at its base, composed of many valves. That species which is found in moist corn fields, bears its fruit upon a naked stalk ; other leafy stalks, that are barren, come up later, and continue after the first are shrivelled. The rough, naked stem of the Shave Grass, is used by turners

* Equisetum. † Ophioglossum. ‡ Osmunda.
and

and cabinet-makers, to give their work a polish. The capsules in Adderstongue point along both sides of the spike in a jointed row, which is divided into as many cells as there are joints ; these cells, when the seeds are ripe, open crossways. The common species is distinguished by an egg-shaped leaf, and a very slender spike growing on a fruit-stalk. Moonwort has globular capsules, disposed in a bunch ; the seeds are very small and numerous. The common sort grows in hilly pastures : it has a solitary, naked stem, and one winged leaf. The Osmund Royal is found in putrid marshes ; its leaves are doubly winged, and bear bunches of flowers at the ends. Rustyback* has the whole under surface of the leaves covered with the fructification. In the various species of Polypody †, each fructification forms a distinct, round dot, placed on the under surface of the leaf. There are many species, generally known by the name of Ferns ; that which occurs most commonly is called Male Fern, and is found in woods, heaths, and stony places ; it has a chaffy stem ; the leaves are doubly winged ; the wings blunt and a little scoloped. Spleenwort ‡ produces its fructifications in straight lines. Hartstongue has entire, simple leaves, resembling the form of a tongue, with hairy stalks ; it grows on moist, shady rocks.

* *Agrostidium*. † *Polypodium*. ‡ *Asplenium*.

In Maidenhair* the flowers are disposed in oval spots, towards the ends of the leaves, which are turned back upon them. The true Maidenhair has leaves which are doubly compound, the little leaves alternate; the wings are shaped like a wedge, divided into lobes, and grow upon foot-stalks. Let us now proceed to the Mosses, which differ from the Ferns, in having leaves distinct from the stalk; from the midst of these leaves are seen small threads, terminated by a small body, the whole corresponding with stamens; shorter threads, supposed to be pointals, sometimes grow on the same plant, and sometimes upon a distinct one; the tips of the longer threads have been discovered to be capsules: in some genera they are covered with a veil or cap; in others they are without this defence; which distinction serves as a division to the order. Mosses, though apparently insignificant, are not useless; they protect the roots of tender plants equally from the extremes of cold and heat; and many kinds of them, by vegetating in the shallow parts of pools and marshes, convert, in the course of a long period of time, that space which before was only water and bog, into useful land and fruitful pastures. Neither Clubmoss†, Bogmoss‡, or Earthmoss§, has any veil: the first has a two-valved capsule, sitting at the base of the leaves;

* *Adiantum*. † *Lycopodium*. ‡ *Sphagnum*. § *Phascum*.
the

the second has a smooth mouth, and the capsule covered with a lid ; and the third is known by its fringed mouth, covered with a lid tapering to a point. Hairmoss * has a capsule covered with a conical lid, sitting upon a small rising eminence, which supplies the place of a receptacle ; a woolly veil protects this capsule: the fertile flower is supposed to grow on a distinct individual, under the form of a little rose or star. The Great Golden Maidenhair, the commonest species of this genus, has a simple stems ; and the capsule is of a long, square shape. Marshmoss †, like Hairmoss, has two kinds of fructification: the one a small capsule with a lid, covered with a smooth veil; the other composed of leaves, arranged in the form of a star or rose, with many dusty, globular particles collected into a ball in the centre. None of these fertile flowers, as they are imagined to be, are found in either Threadmoss ‡ or Feathermoss ; but they both have a lidded capsule, covered with a smooth veil. Bryum, or Threadmoss, is distinguished by a naked stalk, and a tubercle at the base of it; whereas the fruit-stalks in the Hypnum or Feathermoss rise from the sides of the shoots, and their base is surrounded by a scaly bulb. There is one species of Threadmoss that is a great preservative to thatch ; it has nearly upright lips

* Polytrichum. † Mnium. ‡ Bryum. § Hypnum.
and

and reflected leaves, which terminate in hoary hairs. Happy is it for the cottager when this moss takes to vegetate on the roof of his humble dwelling; it forms a defence against the injuries of weather, that will last for many years. The Fern Feathermoss is diminutive, but extremely elegant: it grows in shady places, or upon the banks of ditches; the fruit-stalks rise from the end: the wings are simple, though winged; the tips are crested with a lid of a lively red, and the mouth edged with a fringe of the same colour. The Sea-Weeds and Liverworts are included in the third order; some people call them Thongs, because the substance of many of them resembles leather: the parts of their fructification are too little known to supply a regular account of them; for they scarcely admit of a distinction of root, leaf, or stem; much less can we form a precise idea of the more minute parts of the flower: there are small bodies perceptible in the Liverworts, which are conjectured to be the respective kinds of flowers, distinct from each other: the fruit and flowers in the Sea-Weeds are supposed to consist of little bladders, some of which are hollow, and contain hairs within them; others are filled with a kind of jelly. As these matters are not yet sufficiently ascertained to produce a certainty, we must wait patiently till further experiments of naturalists throw more light upon the subject.

subject. Many of these are useful in commencing the operations of nature, in the growth of vegetables upon the barest rocks, receiving no other support than what the air and rain affords them ; as they decay, they are converted into a very fine mould, which nourishes other species ; these, in their turn, are changed into food for Mosses, &c. and they likewise rot, and, in length of time, a soil is formed from the refuse of the whole, capable of maintaining trees, plants, &c. The Lichens, or Liverworts, spread themselves like meal, crust, leaf, or thread, over the ground, rocks, plants, or trees ; and, being very numerous, are subdivided, according to the various peculiarities of the receptacle and manner of growth ; this genus has a roundish, flat, shining, gummy receptacle, and the leaves are covered with a meal or dust. The first section is tubercled ; they adhere closely to the bark of trees, in the form of a crust, studded with convex receptacles or tubercles, which are frequently thought to resemble the lines in writing or maps. The second is the saucer-like, because the crust is sprinkled with hollow receptacles, somewhat like saucers. Thirdly, the tiled, are composed of many small leaves growing circularly ; the smallest in the middle, and those which are largest on the outside. Fourthly, the leafy is distinguished by leaves that are detached from the substance upon which

which they grow, and are jagged or torn in various directions. The saucers, or shields, are large, and frequently grow on fruit-stalks, either in the division of the leaves, or upon their edges. There is one species that is rather upright and leafy; it is white and downy underneath, and branched like the horns of a stag, which has an extraordinary capacity of imbibing and retaining odours, and on that account is useful to the perfumers, as a basis for scented powders. Fifthly, Leatherlike: the leaves of this division resemble leather in substance; the shields, which are large, are mostly found upon the edges of the leaves. Sixthly, Sooty, appearing black as if burnt, and adhering only in one point to the substance upon which they grow. Seventhly, Cup-bearing, consisting at first of a granulous crust, which afterwards unfolds into small leaves; from these arises a stem, supporting the receptacles, which are formed like a cup or drinking glass; upon the edges of these cups are frequently seen little brown or scarlet tubercles. Eighthly, Shrubby, branching out like shrubs or coral. The celebrated Rein-Deer Moss belongs to this division; it is perforated, much branched, the smaller branches nodding. This is almost the only vegetable to be found in the inhospitable climate of Lapland, during the dreary season of winter; but it makes amends for the want of others, by supporting

supporting the Rein-Deer, an animal which not only affords food to the Laplander, but supplies him with every necessary of life. Ninthly, Threadlike: the branches shooting out like so many threads, mostly from the branches of trees, which gives this kind the name of Tree-moss. It is high time to proceed to the Sca-Weeds, which are comprised in the three following genera: Laver*, Oarweed†, and Riverweed‡. The substance of the first of these plants is membranaceous; and the parts of the fructification are inclosed in a membrane, rather transparent and like a bladder. The Oar-weed, Sea-weed, or Sea-wrack, as it is sometimes called, is leathery, and has two kinds of bladders; one of which is smooth and hollow, and interwoven with hairs, and is esteemed to be the barren flowers; the others, regarded as the fertile flowers, are filled with a kind of jelly, which contains small, perforated grains, in each of which is a solitary seed, curiously divided in their inside by partitions. We are not likely to examine many of the two last genera, unless we shall be able to persuade my mother to make an excursion to the sea side, as most of them are found on the sea shore, or in rivers and slow streams. There remains now only the Mushrooms, or Fungi, to speak of, which you know at first sight, from the

* Ulva.

† Fucus.

‡ Conferva.

singularity

singularity of their appearance, being destitute of either branches, leaves, flowers, or any thing similar to the parts of fructification in other vegetables. The Mushrooms*, a very extensive genus, grows horizontally, and is furnished with gills on the under surface; that species of it which is common at the tables of the opulent, and valued for its high flavour, has a convex, scaly, white head, which is supported on a stalk or pillar, and the gills are red; it grows in woods or parks, where the land has been long unploughed. The Spunk† is another genus which grows horizontally, but differs from the last, in having pores instead of gills on the under surface. The Morel‡ is known by a smooth surface underneath, and a kind of network on the upper part. That which is eaten has a naked, wrinkled pillar, and a hat that is egg-shaped and full of cells. Puffball is a Fungus of a roundish form, and filled with a mealy powder, supposed to be the seeds. The Truffle, used for food, has no root, but grows beneath the surface of the ground; it is round and solid; the outside is rough. The method of finding this subterraneous delicacy is by dogs, which are taught to hunt for it by scent: as soon as they perceive it, they begin to bark and scratch up the ground; a sure indication to their employers that the treasure that they are

* Agaricus. † Boletus. ‡ Phallus. § Mycoperdon.

in search of is at hand. The propensities and instincts of animals are an inexhaustible source of wonders to those who are acquainted with them. The structure of plants has furnished us with much subject of admiration, from the slight survey only that we have taken of them, which surely should excite us to observe them with further attention, as leisure and opportunity offer.

Thus, my dear sister, I have gone through all the classes; superficially indeed, but perhaps sufficiently diffuse to give you a taste for my favourite pursuit, which is every thing I had in view when I began this correspondence, to which your return next week will put an agreeable termination. I shall rejoice to resign my office of instructress to my dear Mrs. Snelgrove, who unites with my mother and me in impatiently wishing for the day that shall restore beloved Constance to her affectionate

FELICIA.

PLATE





PLATE I.

EMPALEMENTS, or Parts of Flowers, Letter 3.

PLATE II.

- Fig. 1. Calyx or Cup, as in the Polyanthus.
Fig. 2. Involucrum; a Fence or Umbel; *a*, general;
b, partial.
Fig. 3. Amentum or Catkin.
Fig. 4. A Spatha or Sheath.
Fig. 5. A Glume, Calyx, or Husk; *c c*, the valves;
d d, the Awns.
Fig. 6. A Veil, as in *Mosses*; *a*, Capitulum or Head;
b, the Operculum or Lid; *c*. Calyptra, Hood or
Extinguisher.
Fig. 7. A Cap, as in *Mushrooms*; *a*, Cap or Hat; *b*,
Valve; *c*, Stripe of a *Fungus*.
Fig. 8. *a*, The Receptacle of a compound Flower, not
Chaffy.
Fig. 9. A Spatha and Spadix.
Fig. 10. Strobilus, a Cone; a Pericarpium formed
from an Amentum or Catkin, as Fig. 3.
Fig. 11. *a*, The Pollen viewed with a Microscope;
b, an elastic Vapour discharged from it.

HONEY-CUPS.

- Fig. 12. A Bell-shaped Honey-cup which crowns the
Corolla, as in the *Narcissus*; *a*, the Cup or Necta-
rium.

Fig. 13. Nectaries in the Grass of Parnassus; thirteen between each Stamen.

Fig. 14. The horned Honey-cups of the Aconite.

Fig. 15. The Scale or Honey-cup at the bottom of a Petal of the Crown-Imperial.

PLATE III.

BLOSSOMS.

Fig. 1. A Bell-shaped Blossom.

Fig. 2. A Funnel-shaped Blossom.

Fig. 3. A Ringent Blossom.

Fig. 4. A Personate Blossom.

Fig. 5. A Cruciform Blossom.

Fig. 6. A Butterfly-shaped Blossom.

Fig. 7. A Compound Radiate Flower.

FOLIATION.

By this term we understand the state the Leaves are in, whilst they remain concealed within the *Buds* of the Plant. Linnæus claims the discovery of these distinctions, preceding Botanists not having attended to the *complicate*, or folded state of the Leaves, which are in their manner, either as

Fig. 8. *Convolute*, *rolled together*; when the margin of one side surrounds the other margin of the same Leaf, in the manner of a Cowl or Hood, as in Indian Flowering Reed, Saxifrage, and many Grasses.

Fig. 9. *Involute*, *rolled in*; when their lateral margins are rolled spirally inwards, as in the Poplar, Pear, Violet, &c. &c.

Fig.

- Fig. 10. *Revolute, rolled back*; when their lateral margins are rolled spirally backwards; as in Rosemary, Foxglove, Coltsfoot, &c. &c.
- Fig. 11. *Conduplicate, doubled together*; when the sides of the Leaf are parallel and approach each other, as in Oak, Beech, Walnut. &c. &c.
- Fig. 12. *Equitant, riding*; when the sides of the Leaves lie parallel, and approach in such a manner, as the outer embrace the inner, as in Flower de Luce, Sweet Rush, and some Grasses.
- Fig. 13. *Imbricated*; when the Leaves are parallel with a straight surface, and lie one over the other, as in Lilac, Privet, Crosswort, &c.
- Fig. 14. *Obvolute, rolled against each other*; when their respective margins alternately embrace the straight margins of the opposite leaf, as in the Pink, Campion, Valerian, &c.
- Fig. 15. *Plaited*; when their complication is in plait lengthways, like plicate Leaves, as in the Maple, Marsh Mallow, Vine, &c.
- Fig. 16. *Convolute*, see Fig. 8; more than one Leaf convoluted.
- Fig. 17. *Involute, opposite.* }
- Fig. 18. *Involute, alternate.* } See Involute.
- Fig. 19. *Revolute, opposite.* See Fig. 10.
- Fig. 20. *Equitant, two-edged*; *Equitant, two prominent Angles.* See the difference in Fig. 12, which has not those Angles.
- Fig. 21. *Equitant, three sided*; *Equitant, three ways*, so as to form a Triangle.

Fig. 8. A Thyrsus, exemplified in the Butter-bur.

Fig. 9. An Aggregate Flower, shown in the Scabiosa.

PLATE VIII. AND IX.

LEAVES.

- Fig. 1. Round.
- Fig. 2. Circular.
- Fig. 3. Egg-shaped.
- Fig. 4. Oval.
- Fig. 5. Oblong.
- Fig. 6. Spear-shaped.
- Fig. 7. Strap-shaped.
- Fig. 8. Awl-shaped.
- Fig. 9. Kidney-shaped.
- Fig. 10. Heart-shaped.
- Fig. 11. Crescent-shaped.
- Fig. 12. Triangular.
- Fig. 13. Arrow-shaped.
- Fig. 14. Halbert-shaped.
- Fig. 15. Divided or Cleft.
- Fig. 16. Composed of three Lobes.
- Fig. 17. Divided to the mid rib.
- Fig. 18. With five Angles.
- Fig. 19. Hand-shaped.
- Fig. 20. With winged Clefts.
- Fig. 21. Ditto Jagged.
- Fig. 22. Parted.
- Fig. 23. Tooth-like.
- Fig. 24. Indentments.

Fig

- Fig. 25. Serrated or Sawed.
- Fig. 26. Ending sharp or tapering.
- Fig. 27. ——— sharply nicked.
- Fig. 28. Wedge.
- Fig. 29. Wrinkled.
- Fig. 30. Veined.
- Fig. 31. Tongue-shaped.
- Fig. 32. Scimeter-shaped.
- Fig. 33. Hatchet-shaped.
- Fig. 34. Deltoid, like the old Greek Delta.
- Fig. 35. Three-sided.
- Fig. 36. Channelled.
- Fig. 37. Furrowed.
- Fig. 38. Cylindrical.
- Fig. 39. Finger-shaped, of two.
- Fig. 40. Growing by three on leaf-stalks.
- Fig. 41. Winged, terminated by an odd one.
- Fig. 42. ———, abruptly.
- Fig. 43. ———, alternately.
- Fig. 44. ———, tendrilled.
- Fig. 45. ———, jointedly.
- Fig. 46. ———, Lyre-shaped.
- Fig. 47. Doubly-winged.
- Fig. 48. Doubly three-leaved.
- Fig. 49. Triply three-leaved.
- Fig. 50. Thrice-feathered, abruptly terminated.
- Fig. 51. Ditto, with an odd one.
- Fig. 52. Plaited.

PLATE X. AND XI.

DETERMINATE LEAVES, STEMS, SUPPORTS, &c.

Fig. 1. *a*, *Inflected*, bent inwards; when the Leaf is turned upwards towards the Stem.

b, *Erect*, upright; when the angle they form with the stem is very small.

c, *Spreading* or *expanding*, patent; when they make an acute angle with the Stem.

d, *Horizontal*; when they stand at right angles with the Stem.

e, *Reclined*, reflex; when they are bowed downwards, so that the Apex or Tip is lower than the Base.

f, *Revolute*, rolled back and downwards.

Fig. 2. *g*, *Seminal*, Seed Leaves; which before were the Cotyledons, and are the first which appear.

h, *Cauline*, Stem Leaves, such as grow round the Stem.

i, *Rameous*, Branch Leaves.

k, *Floral*, Flower Leaves; such as are placed at the coming out of the Flower.

Fig. 3. *l*, *Peltated*, or Shield-fashioned; a Leaf which has the foot-stalk inserted into the centre of the lower disk, or surface, as in the Water Lily, Jack in a Box, &c.

m, *Petiolated*; when there is a Petiole fastened to the Leaf of the margin of the base.

n, *Decurrent*, running down; when the base of a Sessile Leaf extends itself downwards along the Stem, beyond the proper base

base or termination of the Leaf, as in the Thistle, Globe Flower.

o, Sessile, squat ; when the Leaf has no Petiole, but is fastened immediately to the Stem.

p, Amplexicaul, embracing the Stalk ; when the base of the Leaf embraces the Stem crossways on both sides, or *semi-amplexicaul*, half embracing the Stalk, which only differs from the amplexicaul in that it is in a less degree.

q, Perfoliate, Leaf-pierced ; is when the base of the Leaf is continued across the Stem, till it meet again, so as to surround it.

r, Connate, growing together ; when two opposite Leaves join, and are united into one, as in Hemp, Agrimony.

s, Vaginant, forming a Vagina or Sheath ; when the base of the Leaf forms a cylindric tube that invests the branch. It is called a sheathing leaf.

Fig. 4. *t, Articulated*, jointed ; when one Leaf grows out at the top of the other.

u, Stellate, Starry or Verticillate, whorled ; when the Stalk is surrounded in Whorls by more than two Leaves : and these again receive the denomination of Tern, Quatern, Quina, Sena, &c, according to the number of Leaves of which the Star or Whorl is composed, as in African Almond, Rosebay, &c.

w, Quatern, Fourfold. See the last Definition.

x, Opposite ; when the Cauline Leaves come out in pairs facing each other, and sometimes

times each pair is crossed by the next, so that they point four different ways.

y, Alternate; when they come out singly and follow in gradual order.

z, Accrose, Awny, Chaffy; when it is linear and persisting, as in Pine Tree, and Juniper.

a, Imbricated; when they lie over each other like the tiles of a house.

b, Fasciculated, bundled; when many come from the same point, as in the Larch Tree.

Fig. 5. *Spatulated*, resembling a Spatula; when the figure is roundish, but lengthened out by the addition of a linear base that is narrower.

Fig. 6. *c, Squamosa Culm, or Straw*; when it is covered with imbricate scales.

d, Repent, creeping; when by lying upon the ground, or touching a tree, wall, &c. they put forth roots at certain intervals, as in Ivy, Trumpet Flower, &c.

Fig. 7. *Frons*. Frond is a species of Trunk, composed of a Branch and a leaf blended together, and is frequently united with the fructification; it belongs to Palms, &c.

Fig. 8. *Articulate*; jointed Straw or Culm; when they are distinguished from space to space by knots or joints.

Fig. 9. *Volubiles*, twining; when they ascend spirally, by the branch of some other plant. These wind either to the left, according to the motion of the sun, (as it is commonly phrased,) as in Hops, Honey-suckle, &c. or to the right, contrary to the sun's.

sun's motion, as in Bindweed, Malabar Nightshade, Kidney Bean, &c.

Fig. 10. *Dichotomous*; forked; when the division is always in two parts.

Fig. 11. *Brachiatus*, having Arms; when the branches are opposite, and each pair is crossed by the pair above or below it.

Fig. 12. *cc*, *Bractea*, Floral Leaves; differing in shape and colour from the rest, as in the Lime Tree, Fumitory, &c.

ff, The common Leaves.

Fig. 13. *Pediced Glands*; borne on Pedicles, *g g*.

Fig. 14. *Tendril* or *Clasper*; *h*, is a filiform spiral band, by which a plant fastens itself to any other body, as in the Vine, Heart Pea, and Trumpet Flower.

i, *Concave Glands*, are either Petiolar, when they are on the Petioles, as in the Palma Christi, Passion Flower, Sensitive Plant, &c.

Follicaceous; when they are produced from the Leaves, and these are from the Serratures, as in the Willow: from the Base, as in the Peach, Gourd, &c.; from the Back, as in the Tamarisk; or from the Surface, as in the Butterwort, Sundew, &c.

Stipular, when they are produced from Stipula, as in Mountain Ebony, &c.

Capillary, like hairs, as in the Currant Tree, Snap Dragon, &c.

Pores only, as in the Tamarind Tree and Viscous Campion.

k, *Stipula* is a scale or small Leaf, stationed on each side of the base of the Petioles or Peduncles

Peduncles when they are first appearing, as in the Papilionaceous Flowers; also, in the Tamarind, Wild Cherry, Rose, &c.

Fig. 15. *p p*, Opposite Leaves. See Fig. 4.

q q, *Axillary*, coming out from the Wings; that is, either between the Leaf and the Stem, or between the Branch and the Stem.

Fig. 16. *n*, *Aculeus*, a Prickle, is a kind of Armature, proceeding from the Cortex of the plant only, as in the Rose, Bramble, &c.

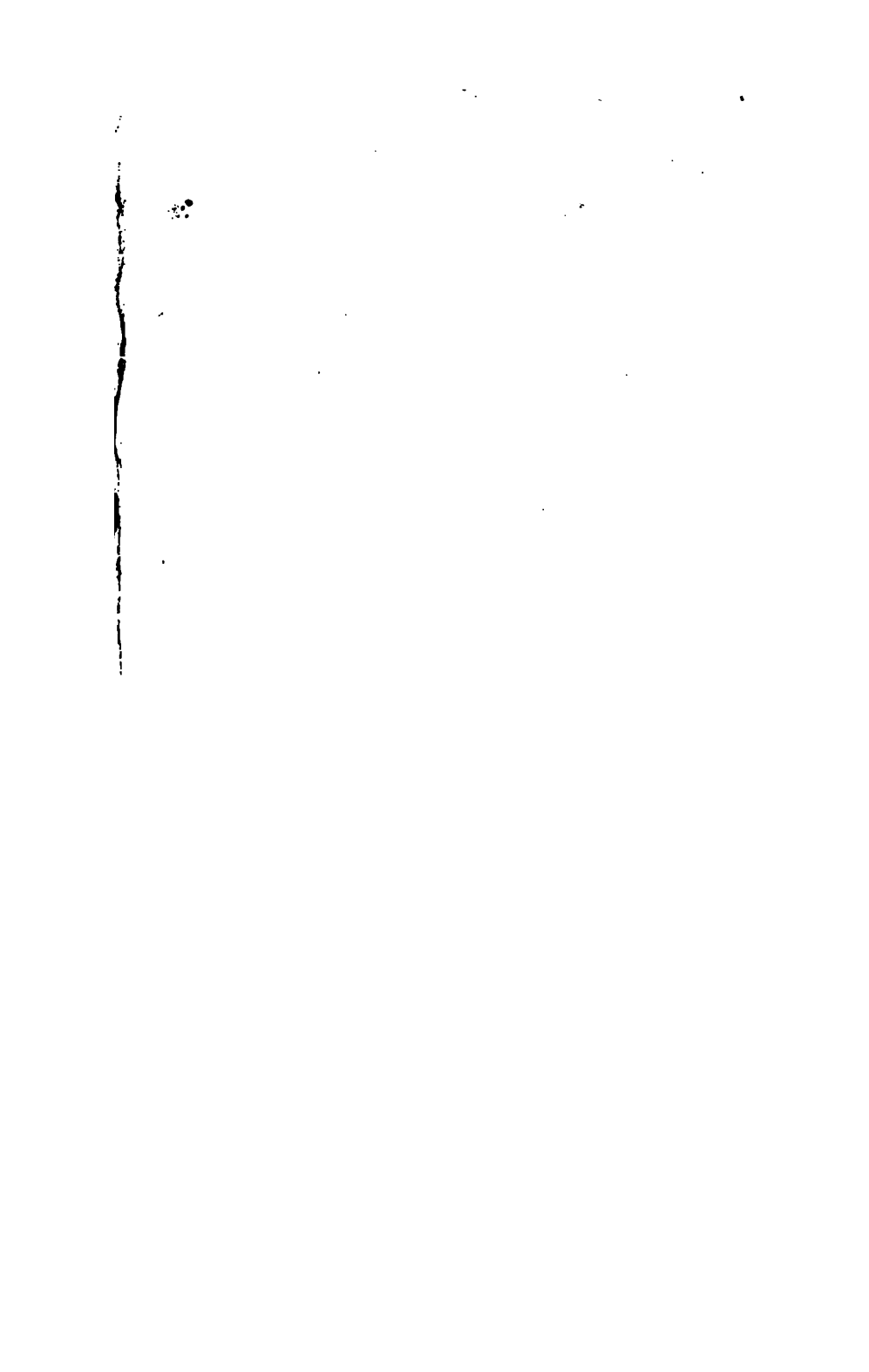
o, Triple Prickle or Fork.

Fig. 17. *l*, *Spina*, a Thorn, is a kind of sharp weapon or armature, protruded from the wood of the plant, as in the Plum Tree, Buckthorn, &c. It will often disappear by culture, as in the pear.

m, A Triple Spine.

FINIS.













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PLATE IV.
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Fig. 16



Fig. 17



Fig. 18



Fig. 19



Fig. 20

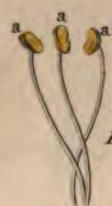


Fig. 21



Fig. 22



Fig. 23



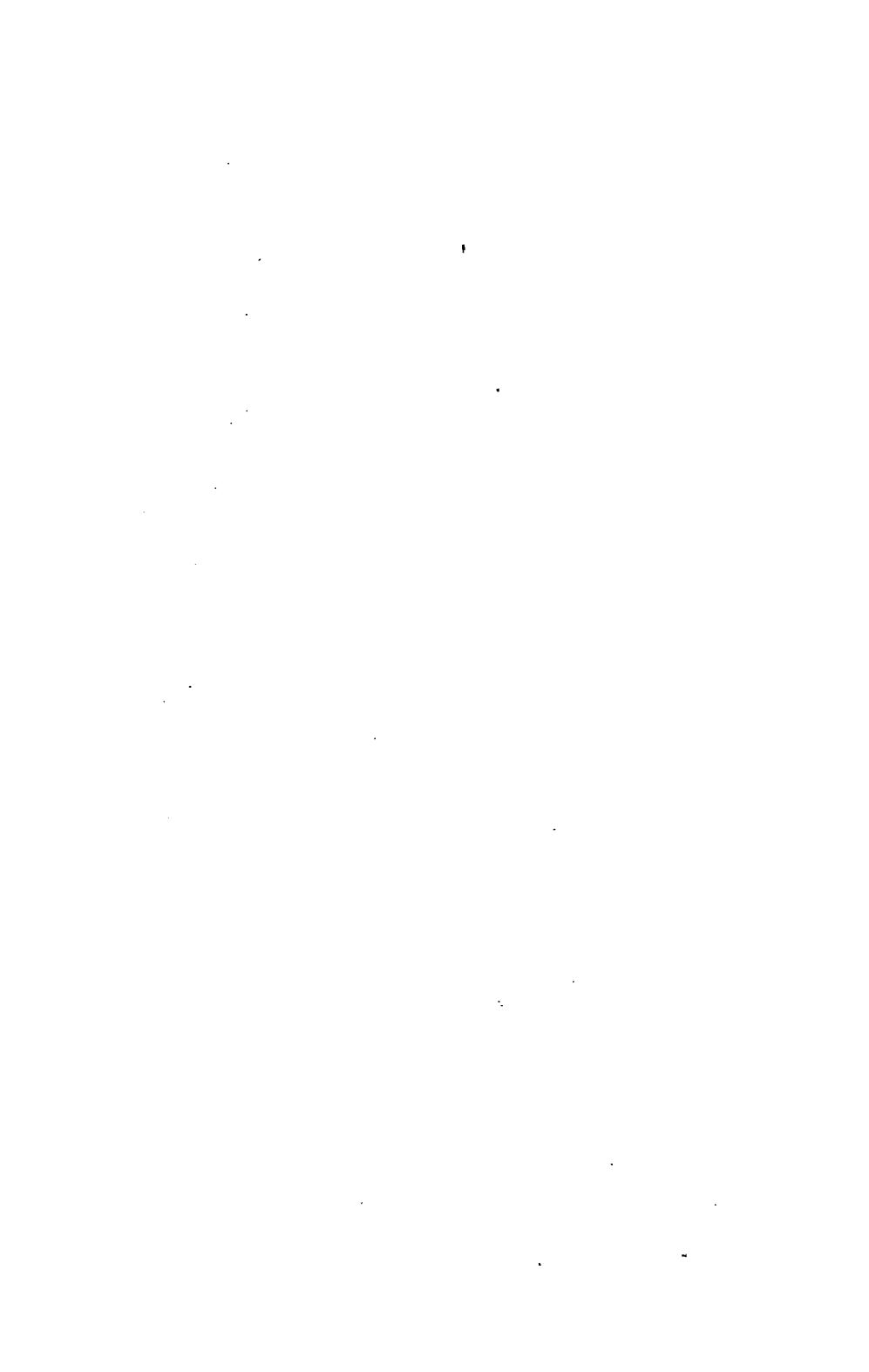
Fig. 24



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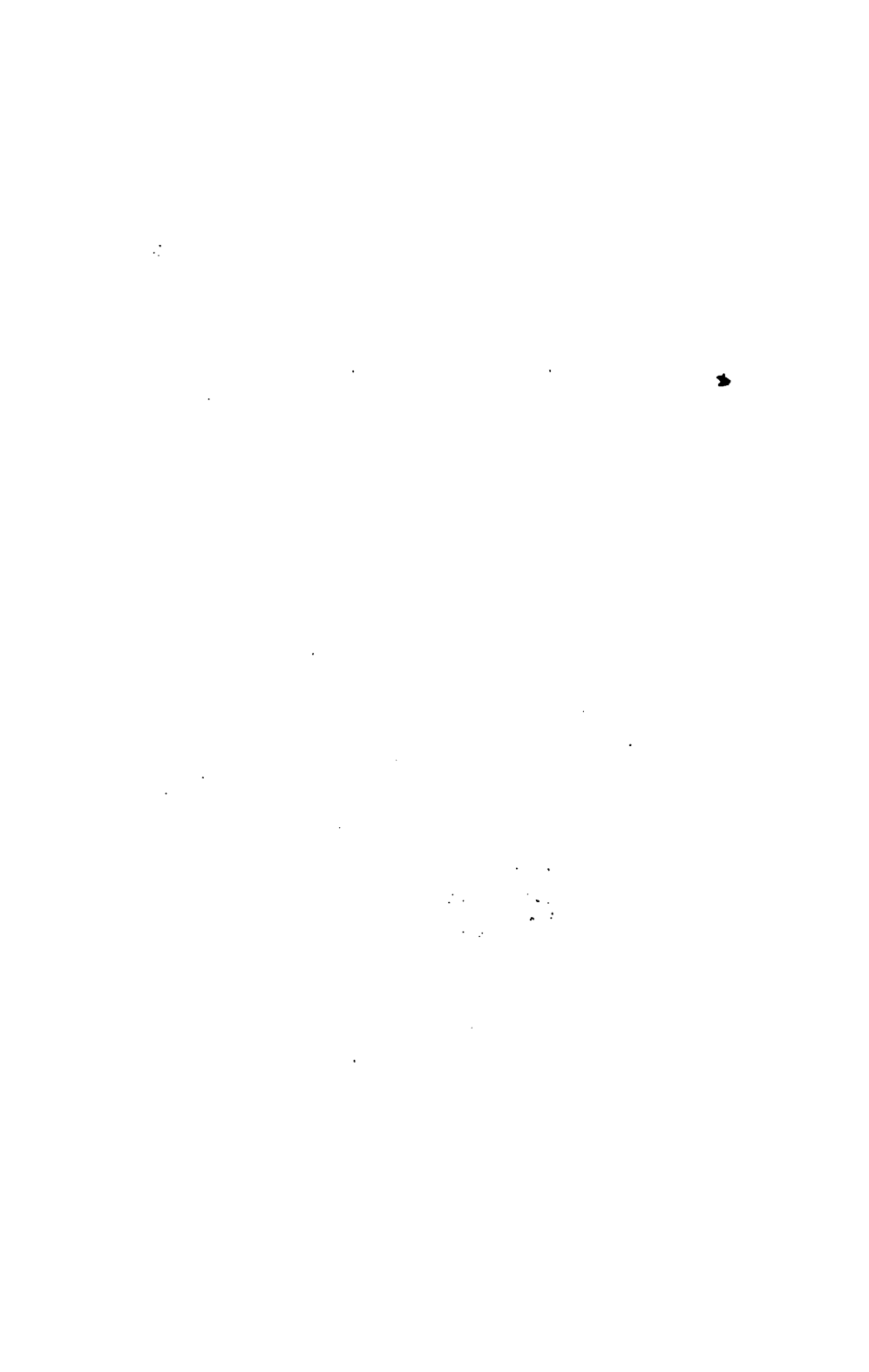
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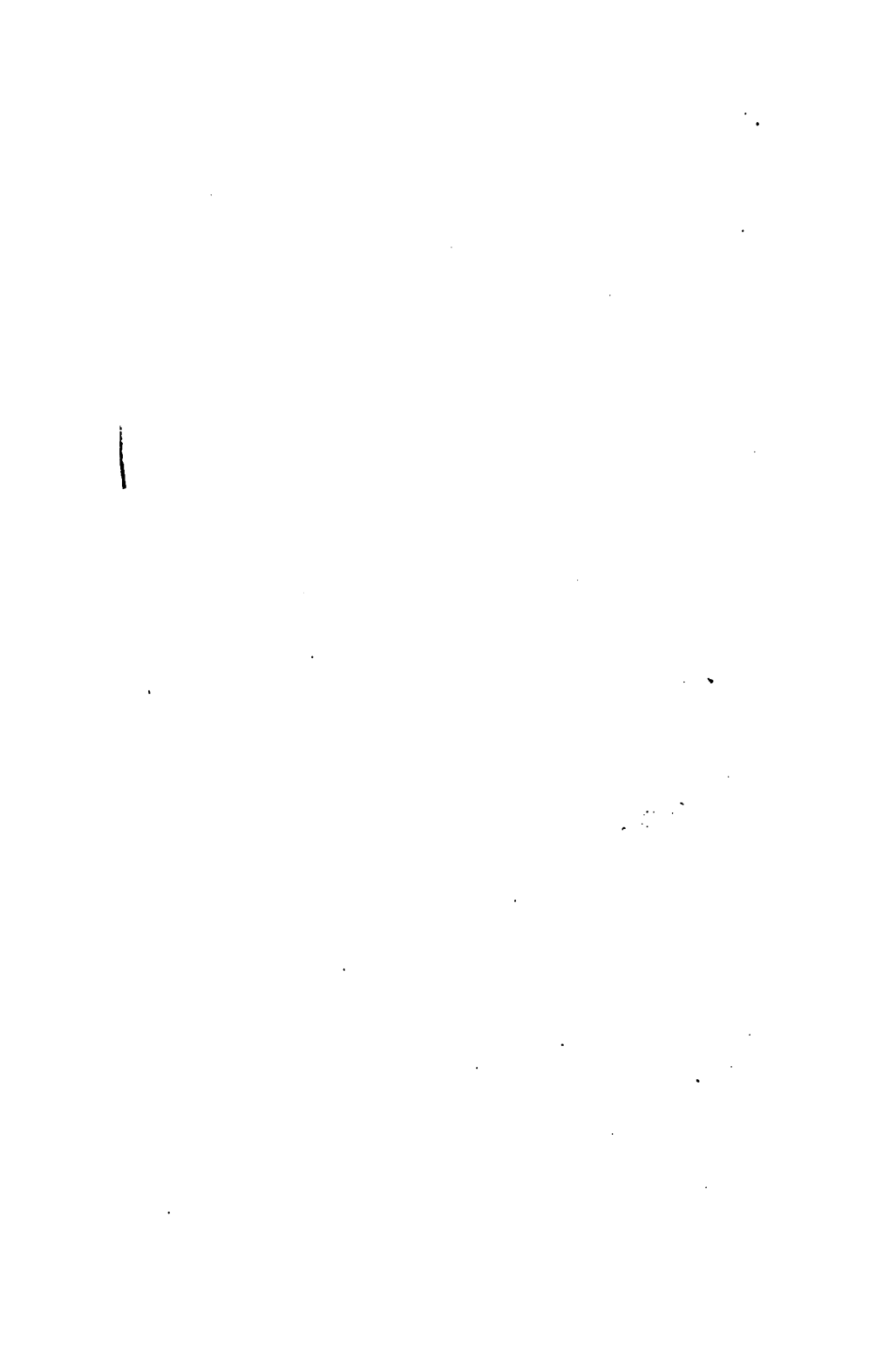














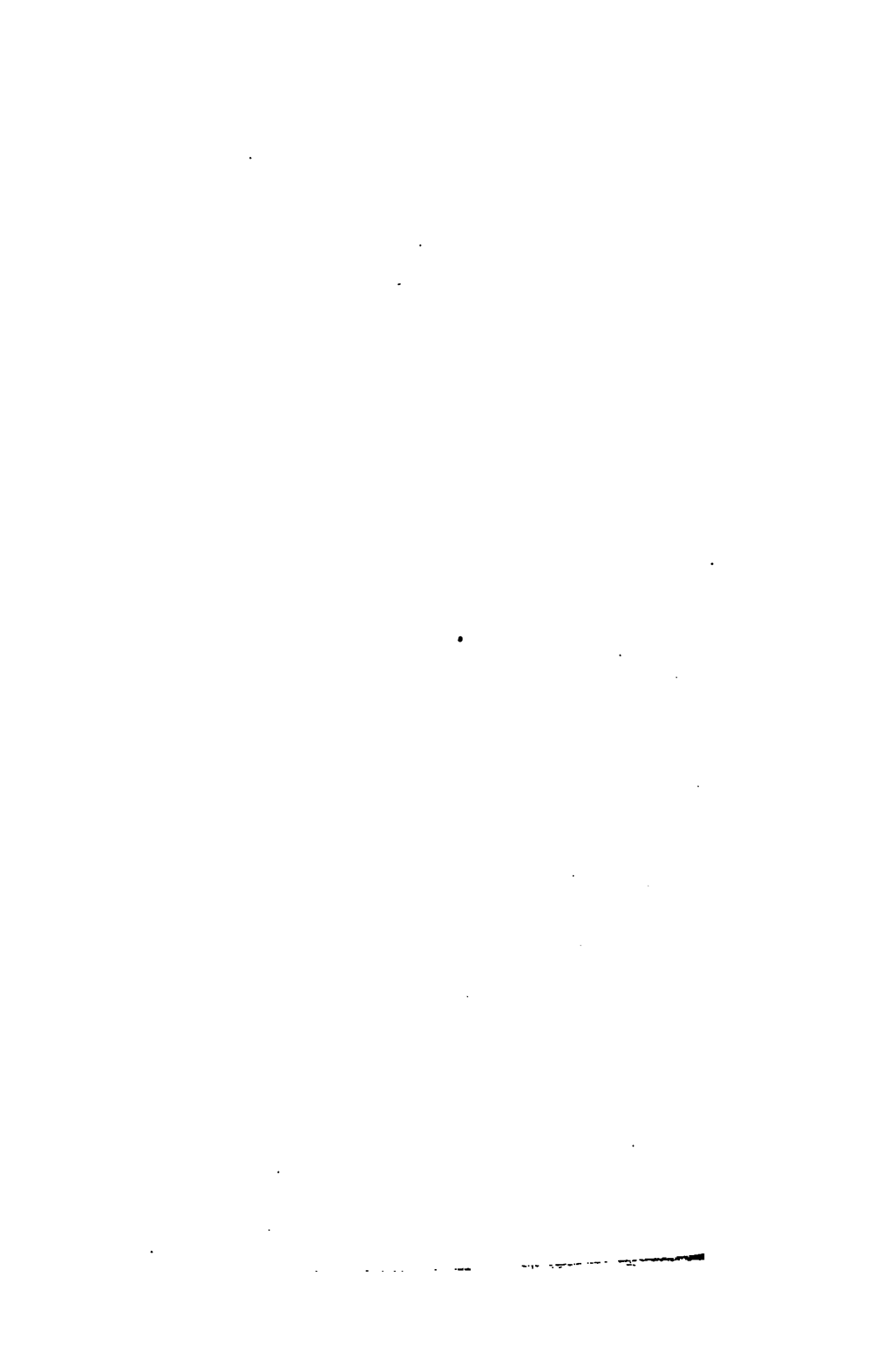


PLATE X

Fig. 1



Fig 2



Fig 3



Fig 5



Fig. 7

Fig. 8



Fig. 6



Fig. 9



Fig. 10



Fig. 11



Fig. 12



Fig. 13



Fig. 14

Fig. 15



Fig. 16



Fig. 17

